126-TRC-09-003

SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Mazda Motor Corporation
2009 Mazda3 S Sedan Touring
NHTSA No. C95400

TRANSPORTATION RESEARCH CENTER INC.
10820 State Route 347
East Liberty, Ohio 43319

April 29, 2009

FINAL REPORT

Prepared Under Contract No.: DTNH22-08-P-0097

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
1200 New Jersey Avenue, SE
West Building, 4th Floor (NVS-221)
Washington, DC 20590

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16. Abstract A test was conducted on a 2009 Mazda3 S Sedan Touring, NHTSA No. C95400, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-02 for the determination of FMVSS 126 compliance. Test failures identified were as follows: Scalar 9.5 SWA251 Clockwise Initial Steer Sine with Dwell			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, an MY 2009 Mazda Mazda3 S meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems."

This standard establishes performance and equipment requirements for Electronic Stability Control (ESC) Systems installed in passenger cars, multipurpose passenger vehicles, trucks and buses with a gross vehicle weight rating of 4,536 kilograms or less.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the MY 2009 Mazda3 was conducted at Transportation Research Center Inc. (TRC Inc.) in accordance with NHTSA TP-126-02, dated November 19, 2008.

The vehicle was inspected to ensure it was equipped with an ESC System that:

- Augments vehicle directional stability by applying and adjusting brake torques individually at each wheel to induce a correcting yaw moment to a vehicle;
- Is computer controlled with the computer using a closed-loop algorithm to limit vehicle oversteer and to limit vehicle understeer;
- Has a means to determine the vehicle's yaw rate and to estimate its side slip or side slip derivative with respect to time;
- Has a means to monitor driver steering inputs;
- Has an algorithm to determine the need, and a means to modify engine torque, as necessary, to assist the driver in maintaining control of the vehicle, and
- Is operational over the full speed range of the vehicle (except at vehicle speeds less than 15km/h (9.3mph) or when being driven in reverse).

The vehicle was subjected to a 0.7Hz sine with dwell steering maneuver to ensure that it would meet the stability and responsiveness requirements of the standard as follows:

- At 1.0 second after completion of a required sine with dwell steering input, the yaw rate of the vehicle must not exceed 35 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).
- At 1.75 seconds after completion of a required sine with dwell steering input, the yaw rate of the vehicle must not exceed 20 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).
- The lateral displacement of the vehicle center of gravity with respect to its initial straight path must be at least 1.83 m (6 feet) (for vehicles with a GVWR of 3,500kg (7,716 lb) or less) when computed 1.07 seconds after the Beginning of Steer (BOS) at the specified steering wheel angles.

System malfunction simulations were executed to verify vehicle could identify and indicate a malfunction.

The vehicle's ESC System does not appear to meet the performance and equipment requirements as required by FMVSS 126. The test results are summarized on the following summary sheet.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS …continued

DATA SUMMARY (Sheet 1 of 2)

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger car

VEHICLE NHTSA NO.: C95400 VIN: JM1BK323691232072

VEHICLE TYPE: Passenger car DATE OF MANUFACTURE: 09/08

LABORATORY: Transportation Research Center Inc.

REQUIREMENTS
PASS/FAIL

ESC Equipment and Operational Characteristics (Data Sheet 2)

The vehicle is to be equipped with an ESC system that meets the equipment and operational characteristics requirements. (S126, S5.1, S5.6) PASS

ESC Malfunction Telltale (Data Sheet 3)

Vehicle is equipped with a telltale that indicates one or more
PASS
ESC system malfunctions. (S126, S5.3)

"ESC Off" and other System Controls and Telltale (Data Sheet 3 & 4)

Vehicle is equipped with an ESC off telltale indicating the vehicle has been put into a mode that renders the ESC system unable to satisfy the performance requirements of the standard, if such a mode exists. (S5.5.1) PASS

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS ...continued

DATA SUMMARY (Sheet 2 of 2)

REQUIREMENTS	PASS/FAIL
If provided, off control and other system controls as well as the ESC off telltale meets the operational requirements (S126, S5.4, S5.4.1, S5.4.2, S5.5.4, and S5.5.9)	PASS
Vehicle Lateral Stability (Data Sheet 8)	
Yaw Rate Ratio at 1 second after COS is less than 35% of peak value. (S126, S5.2.1)	FAIL
Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value. (S126, S5.2.2)	FAIL
Vehicle Responsiveness (Data Sheet 8)	
Lateral displacement at 1.07 seconds after BOS is at least 1.83 m (6 feet) for vehicles with a GVWR of 3,500kg (7,716 lbs.) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 kg (7,716 lbs.). (S126 S5.2.3)	PASS
ESC Malfunction Warning (Data Sheet 9)	
Warning is provided to driver after malfunction occurrence. (S126. S5.3)	PASS
Malfunction telltale stayed illuminated as long as malfunction existed and must extinguished after malfunction was corrected. (S126, S5.3.7)	PASS

3.0 TEST DATA

DATA SHEET 1 (Sheet 1 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger car

NHTSA No.: C95400 TEST DATE: 3-24-09

VIN: JM1BK323691232072 MANUFACTURE DATE: 09/08

GVWR: 1,792 KG FRONT GAWR: 981 KG REAR GAWR 811 KG

SEATING POSITIONS: FRONT 2 REAR 3

ODOMETER READING AT START OF TEST: 158 (254.3) Miles (Kilometers)

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:
Front Axle P205 / 50R 17 Rear Axle P205 / 50R 17

INSTALLED TIRE SIZE(S) ON VEHICLE:

From Tire Sidewall	Front Axle	Rear Axle
Manufacturer and Model	Goodyear Eagle RS-A	Goodyear Eagle RS-A
Tire Size Designation	P205 / 50R 17 88V	P205 / 50R 17 88V

Are installed tire sizes same as labeled tire sizes? X Yes _____ No
If no, contact COTR for further guidance.

DRIVE CONFIGURATIONS (MARK ALL THAT APPLY):
X Two Wheel Drive (2WD): (X) Front Wheel Drive ( ) Rear Wheel Drive
_____ All Wheel Drive (AWD)
_____ Four Wheel Drive Automatic – differential not locked full time (4WD Automatic)
_____ Four Wheel Drive High Gear Locked Differential (4WD HGLD)
_____ Four Wheel Drive Low Gear (4WD Low)
_____ Other (define _____)

3.0 TEST DATA....continued

DATA SHEET 1 (Sheet 2 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

DRIVE CONFIGURATIONS AND MODES: (ex. default, performance, off)
(For each of the vehicle's drive configurations identify available operating modes)

Drive Configuration 2WD – front wheel drive
Mode(s) default

Drive Configuration 2WD – front wheel drive
Mode(s) ESC Off & TCS Off

Drive Configuration _____
Mode(s) _____

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

X ESC	X Traction Control	____ Roll Stability Control
____ Active Suspension	X Electronic Throttle Control	____ Active Steering
X ABS		

List other systems; _____

REMARKS:

RECORDED BY: Alan Ida DATE: 3-17-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

3.0 TEST DATA....continued

DATA SHEET 2 (Sheet 1 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger car

NHTSA No.: C95400 TEST DATE: 3-17-09

ESC SYSTEM IDENTIFICATION:
Manufacturer/Model Continental Automotive Systems / Model #: Mk60

ESC SYSTEM HARDWARE (Check applicable hardware):

X Electronic Control Unit	X Hydraulic Control Unit
X Wheel Speed Sensors	X Steering Angle Sensor
X Yaw Rate Sensor	X Lateral Acceleration Sensor

List other components; _____

ESC SYSTEM OPERATIONAL CHARACTERISTICS:

System is capable of generating brake torques at each wheel — X Yes (PASS) / ____ No (FAIL)

List and describe component(s): Hydraulic brake system

System is capable of determining yaw rate — X Yes (PASS) / ____ No (FAIL)

List and describe component(s): Yaw Rate Sensor

System is capable of monitoring driver steering input — X Yes (PASS) / ____ No (FAIL)

List and describe component(s): Steering Wheel Angle Sensor

System is capable of estimating side slip or side slip derivation — X Yes (PASS) / ____ No (FAIL)

List and describe component(s): Hydraulic Control Unit
Wheel Speed Sensors
Steering Angle Sensor
Yaw Rate Sensor
Lateral Acceleration Sensor

3.0 TEST DATA....continued

DATA SHEET 2 (Sheet 2 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

ESC SYSTEM OPERATIONAL CHARACTERISTICS (continued):

System is capable of modifying engine torque during ESC activation. __X__ Yes (PASS) _____ No (FAIL)

Method used to modify engine torque: ESC countermeasures include modifying engine torque which is accomplished by reducing spark advance and/or engine fuel cut.

System is capable of activation at speeds of 20 km/h (12.4 mph) and higher. __X__ Yes (PASS) _____ No (FAIL)

Speed system becomes active. 14.4 km/h

System is capable of activation during the following driving phases (acceleration, deceleration, coasting, and during activation of ABS or traction control). __X__ Yes (PASS) _____ No (FAIL)

Driving phases system is capable of activation. accelerating, braking, coasting, ABS activation, TCS activation in the forward direction only.

Vehicle manufacturer submitted documentation explaining how the ESC system mitigates understeer? __X__ Yes (PASS) _____ No (FAIL)

DATA INDICATES COMPLIANCE PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida DATE: 3-17-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

3.0 TEST DATA….continued

DATA SHEET 3 (Sheet 1 of 5)
ESC MALFUNCTION AND OFF TELLTALES

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger car

VEHICLE NHTSA NO. C95400 TEST DATE: 3-17-09

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? X Yes (Pass) ____ No (Fail)

Telltale Location Instrument cluster – between speedometer and tachometer. Driver Information Center (DIC) displays message: "Service ESC"

Telltale Color yellow

Telltale symbol or abbreviation used.

 Or **ESC**

X Vehicle uses this symbol
____ Vehicles uses this abbreviation
____ Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used.

Uses the symbol above, however the symbol is missing the side mirrors; Also there is a secondary telltale next to the tachometer which reads "DSC Off"

Is telltale part of a common space? X Yes ____ No

Is telltale also used to indicate activation of the ESC system? X Yes ____ No

If yes, explain telltale operation during ESC activation: telltale light flashes

23. DATA SHEETS....continued

DATA SHEET 3 (Sheet 2 of 2)
ESC MALFUNCTION AND OFF TELLTALES

"ESC OFF" Telltale (if provided)

Vehicle is equipped with "ESC Off" telltale? ___X__Yes _____No

Is "ESC OFF" telltale combined with "ESC Malfunction" telltale utilizing a two part telltale
___X__Yes _____No

Telltale Location ___Instrument cluster – next to tachometer_

Telltale Color _____yellow_____

Telltale symbol or abbreviation used.

Or **ESC OFF**

_____Vehicle uses this symbol
_____Vehicle uses this abbreviation
___X___Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used.

_____Uses the following telltale: DSC Off_____

Is telltale part of a common space? ___X__ Yes _____ No

DATA INDICATES COMPLIANCE PASS/FAIL ___PASS____
(Vehicle is compliant if equipped with a malfunction telltale)

REMARKS:

RECORDED BY: __Alan Ida_____ DATE:_____3/17/09_____
APPROVED BY: __Jeff Sankey_____ DATE:_____4/30/09_____

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 1 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

"ESC OFF" Controls Identification and Operational Check:

Is the vehicle equipped with a control or controls whose purpose is to deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard?

__X__ Yes _____ No

Type of control or controls provided? (mark all that apply)

_____X_____ Dedicated "ESC Off" control
_____ Multi-functional control with an "ESC Off" mode
_____ Other (describe)

Identify each control location, labeling and selectable modes.

First Control:
Location Left dashboard panel
Labeling DSC Off
Modes ESC Off & TCS Off in parallel

Second Control:
Location N/A
Labeling N/A
Modes N/A

Identify standard or default drive configuration 2WD – front wheel drive

Verify standard or default drive configuration selected. __X__ Yes _____ No

Does the "ESC Off" telltale illuminate upon activation of the dedicated ESC off control or selection of the "ESC Off" mode on the multi-function control?

__X__ Yes _____ No (fail)

Does the "ESC Off" telltale extinguish when the ignition is cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

__X__ Yes _____ No (fail)

If no, describe how the off control functions:

_____

_____

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 2 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

If a multi-function control is provided, cycle through each mode setting on the control and record which modes illuminate the "ESC Off" telltale. Also, for those modes that illuminate the ESC Off" telltale identify if the telltale extinguishes upon cycling the ignition system.

Control Modes	"ESC Off" telltale illuminates upon activation of control? (Yes / No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes / No)
N/A	N/A	N/A

For each mode that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition was cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

_____ Yes _____ No (fail)

Other System Controls that have an ancillary effect on ESC Operation:

Is the vehicle equipped with any ancillary controls that upon activation may deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard?

_____ Yes __X__ No

List and describe each control (i.e. alternate drive configuration selection controls):

Ancillary Control: System N/A
Control Description N/A
Labeling N/A

Ancillary Control: System N/A
Control Description N/A
Labeling N/A

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 3 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Activate each control listed above and record whether the control illuminates the "ESC Off" telltale. Also, record warnings or messages provided regarding the ESC system.

Ancillary Control	Control Activates "ESC Off" Telltale? (Yes/No)	Warnings or Messages Provided
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

For those controls that illuminate the "ESC Off" telltale above identify if the "ESC Off" telltale extinguishes upon cycling the ignition system.

Ancillary Control	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
N/A	N/A
N/A	N/A
N/A	N/A

For each control that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition is cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position? If the control activated places the vehicle into a low-range four-wheel drive configuration designed for low-speed, off–road driving, the ESC system may remain turned off after the ignition has been cycled off and then back on and therefore the "ESC Off" telltale may not extinguish.

_____ Yes _____ No (fail)

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida DATE: 3/17/09

APPROVED BY: Jeff Sankey DATE: 4/30/09

DATA SHEET 5 (Sheet 1 of 3)
VEHICLE AND TEST TRACK DATA

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger car

NHTSA No.: C95400 TEST DATE: 3-24-09

Test Track Requirements: Test Surface Slope (0-1 %) 1 %

Peak Friction Coefficient (at least 0.9) 0.9

Full Fluid Levels: Fuel X Coolant X Other Fluids Washer (specify)

Tire Pressures: **Required:** Front Axle 220.0 KPa Rear Axle 220.0 KPa
Actual: LF 220.0 KPa RF 220.0 KPa LR 220.0 KPA RR 220.0 KPa

Vehicle Dimensions: Track Width 153.3 cm Wheelbase 263.8 cm

Roof Height 145.0 cm

Vehicle weight ratings: GAWR Front 981 KG GAWR Rear 811 KG

Unloaded Vehicle Weight (UVW)

Front Axle 828.1 KG Left Front 410.3 KG Right Front 417.8 KG

Rear Axle 498.1 KG Left Rear 254.7 KG Right Rear 243.4 KG

Total UVW 1,326.2 KG

Baseline Weight and Outrigger Selection (only for MPVs, Trucks, Buses)

Calculated Baseline Weight (UVW+ 73 kg) N/A KG

Outrigger size required ("Standard" or "Heavy") N/A
Standard - Baseline weight under 2,722 kg (6,000 lbs)
Heavy - Baseline weight equal to or greater than 2,722 kg (6,000 lbs)

3.0 TEST DATA....continued

DATA SHEET 5 (Sheet 2 of 3)
VEHICLE AND TEST TRACK DATA

UVW with Outriggers (only for MPVs, Trucks, Buses)

Front Axle N/A KG Left Front N/A KG Right Front N/A KG

Rear Axle N/A KG Left Rear N/A KG Right Rear N/A KG

Total UVW w/ Outriggers N/A KG

Loaded Vehicle Weight w/ Driver and Instrumentation (No Ballast)

Front Axle 897.9 KG Left Front 452.0 KG Right Front 445.9 KG

Rear Axle 556.3 KG Left Rear 291.2 KG Left Rear 265.1 KG

Total Loaded weight w/ Driver 1,454.2 KG

Ballast Required = [**UVW** + 168 KG] - **Total Loaded Weight w/ Driver and Instrumentation**

= [1,326.2 KG + 168 KG] - 1,454.2 KG

= 40.0 KG

Total Loaded Vehicle Weight

Front Axle 912.7 KG Left Front 452.5 KG Right Front 460.2 KG

Rear Axle 581.2 KG Left Rear 299.1 KG Right Rear 282.1 KG

Total Loaded Vehicle Weight 1,493.9 KG

3.0 TEST DATA....continued

DATA SHEET 5 (Sheet 3 of 3)
VEHICLE AND TEST TRACK DATA

Center of Gravity and Inertial Sensing System Location at Loaded Vehicle Condition

x-distance (longitudinal) Point of reference is the front axle centerline.
(Positive from front axle toward rear of vehicle.)

y-distance (lateral) Point of reference is the vehicle centerline.
(Positive from the center toward the right.)

z-distance (vertical) Point of reference is the ground plane.
(Positive from the ground up.)

Locations:

	Center of Gravity	Inertial Sensing System
x-distance	102.7 cm	150.1 cm
y-distance	-0.48 cm	0.55 cm
z-distance	55.1 cm	44.2 cm

Distance Between Ultrasonic Sensors: 181.3 cm

Roof Height: 145.0 cm

TEST TRACK DATA MEETS REQUIREMENTS: YES/NO YES
If no, explain: _____

REMARKS:

RECORDED BY: Alan Ida DATE: 3-24-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

3.0 TEST DATA....continued

DATA SHEET 6 (Sheet 1 of 3)
BRAKE AND TIRE CONDITIONING

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger Car

VEHICLE NHTSA No.: C95400

Measured Cold Tire Pressures: LF 220 KPA RF 220 KPA

LR 220 KPA RR 220 KPA

Wind Speed 1.3 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 8.9 °C

Brake Conditioning Time; 10:30 AM Date; 3-24-09

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) 10 stops

Observed deceleration rate range (.5g target) 0.49 – 0.52 g

72 km/h (45 mph) Brake Stops

Number of stops executed (3 required) 3 stops

Number of stops ABS activated (3 required) 3 stops

Observed deceleration rate range 1.0 – 1.2 g

72 km/h (45 mph) Brake Cool Down Period

Duration of cool down period (5 minutes min.) 5.5 minutes

3.0 TEST DATA....continued

DATA SHEET 6 (Sheet 2 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 1 Time: 2:00 PM Date: 3-24-09

Measured Tire Pressures: LF 231.0 KPA RF 231.0 KPA

LR 227.5 KPA RR 224.1 KPA

Wind Speed 6.7 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 13.9 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	Clockwise	0.5-0.6	0.55	46.7
4-6	Counterclockwise	0.5-0.6	0.55	46.7

1 Hz 3 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56±2 (35±1)	30	0.5-0.6	0.26
2	56±2 (35±1)	60	0.5-0.6	0.53
3	56±2 (35±1)		0.5-0.6	
4	56±2 (35±1)		0.5-0.6	

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration; 60 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56±2 (35±1)	60 (cycles 1-10)	0.5-0.6	0.53
4	56±2 (35±1)	60 (cycles 1-9)	0.5-0.6	0.53
		120 (cycle 10)*	N/A	0.95

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9.

3.0 TEST DATA....continued

DATA SHEET 6 (Sheet 3 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 2 Time: 3:05 PM Date: 3-24-09

Measured Tire Pressures: LF 234.4 KPA RF 234.4 KPA
LR 231.0 KPA RR 227.5 KPA

Wind Speed 6.7 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 15.0 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	clockwise	0.5-0.6	0.55	46.7
4-6	counterclockwise	0.5-0.6	0.55	46.7

1 Hz 3 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56±2 (35±1)	30	0.5-0.6	N/A
2	56±2 (35±1)		0.5-0.6	
3	56±2 (35±1)		0.5-0.6	
4	56±2 (35±1)		0.5-0.6	

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration; 60 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56±2 (35±1)	60 (cycles 1-10)	0.5-0.6	0.53
4	56±2 (35±1)	60 (cycles 1-9)	0.5-0.6	0.53
		120 (cycle 10)*	N/A	0.95

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9.

REMARKS:

RECORDED BY: Alan Ida DATE: 3-24-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

3.0 TEST DATA....continued

DATA SHEET 7 (1 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger Car

VEHICLE NHTSA No.: C95400 TEST DATE: 3-24-09

Wind Speed 5.8 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 14.4 °C

Static Data File Number: 0025
Selected Drive Configuration: default - FWD
Selected Mode: default

Preliminary Left Steer Maneuver:
Lateral Acceleration measured at 30 degrees steering wheel angle ($a_{y,30\ degrees}$)

$a_{y,30\ degrees}$ = 0.38 g

Assuming a linear relationship the following ratio should be used to calculate the steering wheel angle at .55g.

$$\frac{30\ \text{degrees}}{a_{y,30\ \text{degrees}}} = \frac{\delta_{SIS}}{0.55\ \text{g}}$$

δ_{SIS} = 43.4 degrees @ 0.55g

δ_{SIS} = 40.0 degrees (rounded)

Steering Wheel Angle at Corrected 0.3 g Lateral Acceleration:

Maneuver #	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1 degree (degrees)	All Conditions Met?
1	Left	2:18 pm	-27.0	Yes
2	Left	2:22 pm	-27.5	Yes
3	Left	2:26 pm	-27.1	Yes
4	Right	2:32 pm	25.7	Yes
5	Right	2:35 pm	25.3	Yes
6	Right	2:38 pm	25.5	Yes

3.0 TEST DATA....continued

DATA SHEET 7 (2 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Average Overall Steering Wheel Angle:

$$\delta_{0.3\ g,\ overall} = (|\delta_{0.3\ g,\ left\ (1)}| + |\delta_{0.3\ g,\ left\ (2)}| + |\delta_{0.3\ g,\ left\ (3)}| + \delta_{0.3\ g,\ right\ (1)} + \delta_{0.3\ g,\ right\ (2)} + \delta_{0.3\ g,\ right\ (3)}) / 6$$

$\delta_{0.3\ g,\ overall}$ = 26.4 degrees
[to nearest 0.1 degree]

REMARKS:

RECORDED BY: Alan Ida DATE: 3-24-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

3.0 TEST DATA....continued

DATA SHEET 8 (1 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger Car

VEHICLE NHTSA No.: C95400 TEST DATE: 3-24-09

Tire conditioning completed	X Yes	____ No
ESC system is enabled	X Yes	____ No
On track calibration checks have been completed	X Yes	____ No
On track static data file for each sensor obtained	X Yes	____ No

Selected Drive Configuration: default - FWD
Selected Mode: default

Overall steering wheel angle ($\delta_{0.3\,g,\,overall}$) 26.4 degrees
Static Data File Number 0034

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5 min between each test run)	Commanded Steering Wheel Angle[1] (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/ Fail	%	Pass/ Fail
1	3:17 pm	1.5* $\delta_{0.3\,g}$	40	12.78	0.01	-0.11	0.11	Pass	-0.87	Pass
2	3:21 pm	2.0* $\delta_{0.3\,g}$	53	16.85	-0.04	-0.06	-0.21	Pass	-0.35	Pass
3	3:25 pm	2.5* $\delta_{0.3\,g}$	66	20.84	0.05	-0.06	0.25	Pass	-0.29	Pass
4	3:28 pm	3.0* $\delta_{0.3\,g}$	79	23.97	-0.01	0.03	-0.04	Pass	0.15	Pass
5	3:32 pm	3.5* $\delta_{0.3\,g}$	92	27.71	-0.06	0.04	-0.21	Pass	0.13	Pass
6	3:35 pm	4.0* $\delta_{0.3\,g}$	106	28.73	-0.40	-0.12	-1.40	Pass	-0.42	Pass
7	3:38 pm	4.5* $\delta_{0.3\,g}$	119	33.56	-0.14	-0.02	-0.41	Pass	-0.06	Pass
8	3:41 pm	5.0* $\delta_{0.3\,g}$	132	37.88	-0.03	0.10	-0.07	Pass	0.26	Pass
9	3:45 pm	5.5* $\delta_{0.3\,g}$	145	42.65	-0.28	-0.07	-0.66	Pass	-0.16	Pass
10	3:48 pm	6.0* $\delta_{0.3\,g}$	158	45.65	1.15	-0.03	2.51	Pass	-0.06	Pass
11	3:51 pm	6.5* $\delta_{0.3\,g}$	172	49.74	0.20	-0.12	0.40	Pass	-0.24	Pass
12	3:54 pm	7.0* $\delta_{0.3\,g}$	185	52.66	0.01	0.01	0.01	Pass	0.01	Pass
13	3:58 pm	7.5* $\delta_{0.3\,g}$	198	53.56	-1.78	0.10	-3.32	Pass	0.19	Pass
14	4:02 pm	8.0* $\delta_{0.3\,g}$	211	55.89	6.46	-0.01	11.55	Pass	-0.02	Pass
15	4:06 pm	8.5* $\delta_{0.3\,g}$	224	59.81	8.43	0.47	14.09	Pass	0.79	Pass
16	4:11 pm	9.0* $\delta_{0.3\,g}$	238	61.09	6.31	-0.14	10.33	Pass	-0.23	Pass
17	4:14 pm	9.5* $\delta_{0.3\,g}$	251	61.85	10.89	0.93	17.61	Pass	1.50	Pass
18	4:17 pm	10.0* $\delta_{0.3\,g}$	264	62.14	7.80	0.31	12.55	Pass	0.50	Pass
19	4:21 pm	10.2* $\delta_{0.3\,g}$	270	61.35	8.93	0.20	14.56	Pass	0.33	Pass

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5*$\delta_{0.3\,g}$, or 270 degrees is utilized, whichever is greater provided the calculated magnitude of 6.5*$\delta_{0.3\,g}$ is less than or equal to 300 degrees. If 6.5*$\delta_{0.3\,g}$, is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of 0.5*$\delta_{0.3\,g}$, without exceeding the 270 degree steering wheel angle.

3.0 TEST DATA....continued

DATA SHEET 8 (2 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Lateral Stability Test Series No. 2 – Clockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5 min between each test run)	Commanded Steering Wheel Angle[1] (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/ Fail	%	Pass/ Fail
1	4:24 pm	1.5* $\delta_{0.3\,g}$	40	-12.21	0.09	0.14	-0.76	Pass	-1.18	Pass
2	4:28 pm	2.0* $\delta_{0.3\,g}$	53	-16.55	-0.01	0.14	0.03	Pass	-0.87	Pass
3	4:31 pm	2.5* $\delta_{0.3\,g}$	66	-19.39	0.15	0.18	-0.76	Pass	-0.93	Pass
4	4:35 pm	3.0* $\delta_{0.3\,g}$	79	-22.89	0.10	0.24	-0.43	Pass	-1.04	Pass
5	4:38 pm	3.5* $\delta_{0.3\,g}$	92	-25.31	0.14	0.17	-0.56	Pass	-0.65	Pass
6	4:41 pm	4.0* $\delta_{0.3\,g}$	106	-30.27	0.31	0.08	-1.02	Pass	-0.25	Pass
7	4:45 pm	4.5* $\delta_{0.3\,g}$	119	-34.12	-0.27	0.14	0.79	Pass	-0.40	Pass
8	4:48 pm	5.0* $\delta_{0.3\,g}$	132	-38.43	-0.72	0.13	1.89	Pass	-0.34	Pass
9	4:51 pm	5.5* $\delta_{0.3\,g}$	145	-42.92	-0.79	0.06	1.84	Pass	-0.13	Pass
10	4:54 pm	6.0* $\delta_{0.3\,g}$	158	-47.34	-0.81	0.16	1.71	Pass	-0.33	Pass
11	4:57 pm	6.5* $\delta_{0.3\,g}$	172	-50.41	1.69	0.21	-3.34	Pass	-0.42	Pass
12	5:00 pm	7.0* $\delta_{0.3\,g}$	185	-53.71	2.73	0.29	-5.09	Pass	-0.54	Pass
13	5:03 pm	7.5* $\delta_{0.3\,g}$	198	-56.92	0.48	0.20	-0.85	Pass	-0.35	Pass
14	5:07 pm	8.0* $\delta_{0.3\,g}$	211	-59.31	-7.62	0.29	12.85	Pass	-0.49	Pass
15	5:10 pm	8.5* $\delta_{0.3\,g}$	224	-62.55	-12.16	-1.18	19.45	Pass	1.89	Pass
16	5:13 pm	9.0* $\delta_{0.3\,g}$	238	-63.41	-14.34	-1.82	22.61	Pass	2.86	Pass
17	5:16 pm	9.5* $\delta_{0.3\,g}$	251	-67.08	-32.62	-21.57	48.63	Fail	32.16	Fail
18	5:20 pm	10.0* $\delta_{0.3\,g}$	264	-65.36	-16.72	-1.51	25.59	Pass	2.31	Pass
19	5:23 pm	10.2* $\delta_{0.3\,g}$	270	-66.36	-22.48	0.61	33.87	Pass	-0.92	Pass

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5*$\delta_{0.3\,g,\,overall}$ or 270 degrees is utilized, whichever is greater provided the calculated 6.5*$\delta_{0.3\,g,\,overall}$ is less than or equal to 300 degrees. If 6.5*$\delta_{0.3\,g,\,overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of 0.5*$\delta_{0.3\,g,\,overall}$ without exceeding the 270 degree steering wheel angle.

During execution of the sine with dwell maneuvers were any of the following events observed?

Rim-to-pavement contact	_____ Yes	__X__ No
Tire debeading	_____ Yes	__X__ No
Loss of pavement contact of vehicle tires	_____ Yes	__X__ No
Did the test driver experience any vehicle loss of control or spinout?	_____ Yes	__X__ No

If "Yes" explain the event and consult with the COTR. _____

_____

_____

3.0 TEST DATA....continued

DATA SHEET 8 (3 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Responsiveness – Lateral Displacement

Maneuver #	Initial Steer Direction	Commanded Steering Wheel Angle ($5.0*\delta_{0.3\,g,\,overall}$ or greater)		Calculated Lateral Displacement[1]	
		Scalar	Angle (degrees)	Distance (m)	Pass/Fail
8	Counter Clockwise	$5.0*\delta_{0.3\,g}$	132	3.33	Pass
9	Counter Clockwise	$5.5*\delta_{0.3\,g}$	145	3.50	Pass
10	Counter Clockwise	$6.0*\delta_{0.3\,g}$	158	3.56	Pass
11	Counter Clockwise	$6.5*\delta_{0.3\,g}$	172	3.61	Pass
12	Counter Clockwise	$7.0*\delta_{0.3\,g}$	185	3.62	Pass
13	Counter Clockwise	$7.5*\delta_{0.3\,g}$	198	3.62	Pass
14	Counter Clockwise	$8.0*\delta_{0.3\,g}$	211	3.70	Pass
15	Counter Clockwise	$8.5*\delta_{0.3\,g}$	224	3.69	Pass
16	Counter Clockwise	$9.0*\delta_{0.3\,g}$	238	3.73	Pass
17	Counter Clockwise	$9.5*\delta_{0.3\,g}$	251	3.72	Pass
18	Counter Clockwise	$10.0*\delta_{0.3\,g}$	264	3.72	Pass
19	Counter Clockwise	$10.2*\delta_{0.3\,g}$	270	3.78	Pass
8	Clockwise	$5.0*\delta_{0.3\,g}$	132	3.29	Pass
9	Clockwise	$5.5*\delta_{0.3\,g}$	145	3.40	Pass
10	Clockwise	$6.0*\delta_{0.3\,g}$	158	3.48	Pass
11	Clockwise	$6.5*\delta_{0.3\,g}$	172	3.55	Pass
12	Clockwise	$7.0*\delta_{0.3\,g}$	185	3.60	Pass
13	Clockwise	$7.5*\delta_{0.3\,g}$	198	3.62	Pass
14	Clockwise	$8.0*\delta_{0.3\,g}$	211	3.68	Pass
15	Clockwise	$8.5*\delta_{0.3\,g}$	224	3.69	Pass
16	Clockwise	$9.0*\delta_{0.3\,g}$	238	3.69	Pass
17	Clockwise	$9.5*\delta_{0.3\,g}$	251	3.63	Pass
18	Clockwise	$10.0*\delta_{0.3\,g}$	264	3.71	Pass
19	Clockwise	$10.2*\delta_{0.3\,g}$	270	3.68	Pass

1. Lateral displacement should be $\geq$ 1.83 m (6 ft) for vehicles with a GVWR of 3,500 kg (7,716 lb) or less; and $\geq$ 1.52 m (5ft) for vehicles with a GVWR greater than 3,500 kg (7,716 lb).

DATA INDICATES COMPLIANCE: PASS/FAIL FAIL

REMARKS:

RECORDED BY: Alan Ida DATE: 3-24-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

DATA SHEET 9
MALFUNCTION WARNING TEST

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / Mazda3 / Passenger Car

VEHICLE NHTSA No.: C95400 TEST DATE: 4-29-09

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: 1) Disconnect left front wheel speed sensor connector. 2) Remove ABS #1 30-amp fuse from underhood fuse box.

MALFUNCTION TELLTALE ILLUMINATION:
Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes _____No

Time for telltale to illuminate after ignition system is activated and vehicle speed of 48± 8 km/h (30± 5mph) is reached.

0 Seconds (must be within 2 minutes) X Pass _____ Fail

ESC SYSTEM RESTORATION:
Telltale extinguishes after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes _____No

Time for telltale to extinguish after ignition system is activated and vehicle speed of 48± 8 km/h (30± 5mph) is reached.

SEE REMARKS Seconds (must be within 2 minutes) X Pass _____ Fail

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

For both wheel speed sensor and ABS fuse restoration, the vehicle must be driven at 10 mph in the forward direction in order to extinguish the malfunction telltale.

RECORDED BY: Alan Ida DATE: 4-29-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

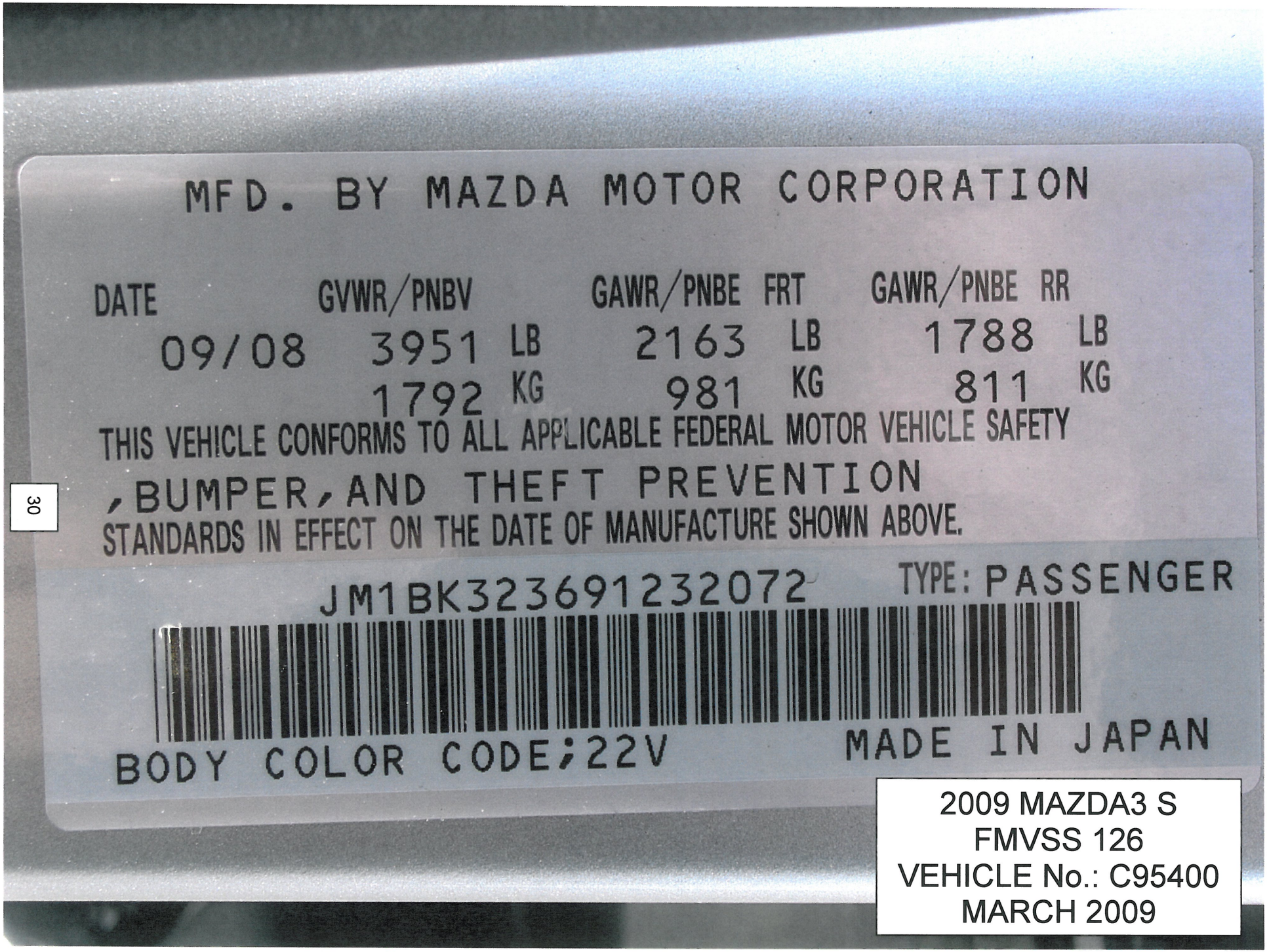
Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-60psi	0.5 psi	±0.5% of applied pressure	Marsh Model: 89562 0-60psi	N/A	By: TRC Date: 2-6-09 Due: 5-7-09
Platform Scales	Vehicle Total, Wheel, and Axle Load	0-2500 lb per each of four pads	0.5 lb	±1.0% of applied load	Mettler Toledo Model: JXGA1000	5225831-5JC	By: Mettler Date: 2-18-09 Due: 5-18-09
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	±800 deg	0.25 deg	±0.25 deg	Heitz Automotive Testing Model: Sprint 3	60303	By: TRC Date: 11-06-08 Due: 11-06-09
Multi-Axis Inertial Sensing System	Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate	Accelerometers: ±2 g Angular Rate Sensors: ±100 deg/s	Accelerometers: ≤10 ug Angular Rate Sensors: ≤0.004 deg/s	Accelerometers: ≤0.05% of full range Angular Rate Sensors: 0.05% of full range	BEI Technologies Model: MotionPAK MP-1	0767	By: BEI Tech. Date: 10-13-08 Due: 10-13-09
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph	0.009 mph	±0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	1400437	By: A-DAT Date: 11-5-08 Due: 11-5-09
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches	0.01 inches	±0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	104619 & 104613	By: Consumers Energy Laboratory Services Date: 12-10-08 Due: 12-10-09
Data Acquisition System [Amplify, Anti-Alias, and Digitize]	Record Time; Velocity; Distance; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.	Sufficient to meet or exceed individual sensors	200 Hz	Sufficient to meet or exceed individual sensors	Dewetron Sidehand DAS Model: DA-121-16 Digitizer Model: Dewe-Orion-1616-100 Amplifier/AntiAliasing: MDAQ-FILT-10-S	12060 1105	By: Dewetron Date: 4-24-08 Due: 4-24-09
Load Cell	Vehicle Brake Pedal Force	0-300 lb	1 lb	±0.05% of full scale	DATRON Model: DTM-LPA	4970-1103	By: TRC Date: per test Due: per test
Coordinate Measurement Machine	Inertial Sensing System Location	0-10 feet	0.001 inch	±0.003% of full scale	FARO International Model: Faro Arm N10	U12-05-08-07108	By: FARO Date: 9-26-08 Due: 9-26-09
Outriggers	No output. Safety Item.	N/A	N/A	N/A	NHTSA Titanium Outriggers Model: Docket 2007-27662-11	N/A	N/A

5.0 PHOTOGRAPHS

5.1 ¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE
5.2 ¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
5.3 VEHICLE CERTIFICATION LABEL
5.4 TIRE AND LOADING INFORMATION LABEL
5.5 WINDOW STICKER (MONRONEY LABEL)
5.6 ESC MALFUNCTION AND ESC OFF TELLTALE
5.7 SECONDARY ESC OFF TELLTALE
5.8 ESC OFF CONTROL
5.9 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED
5.10 ¾ REAR VIEW – TEST VEHICLE INSTRUMENTED
5.11 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM
5.12 STEERING CONTROLLER BATTERY BOX
5.13 VEHICLE SPEED SENSOR
5.14 BODY ROLL SENSOR (DRIVER SIDE)
5.15 BODY ROLL SENSOR (PASSENGER SIDE)

5.1 ¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE

5.2 ¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



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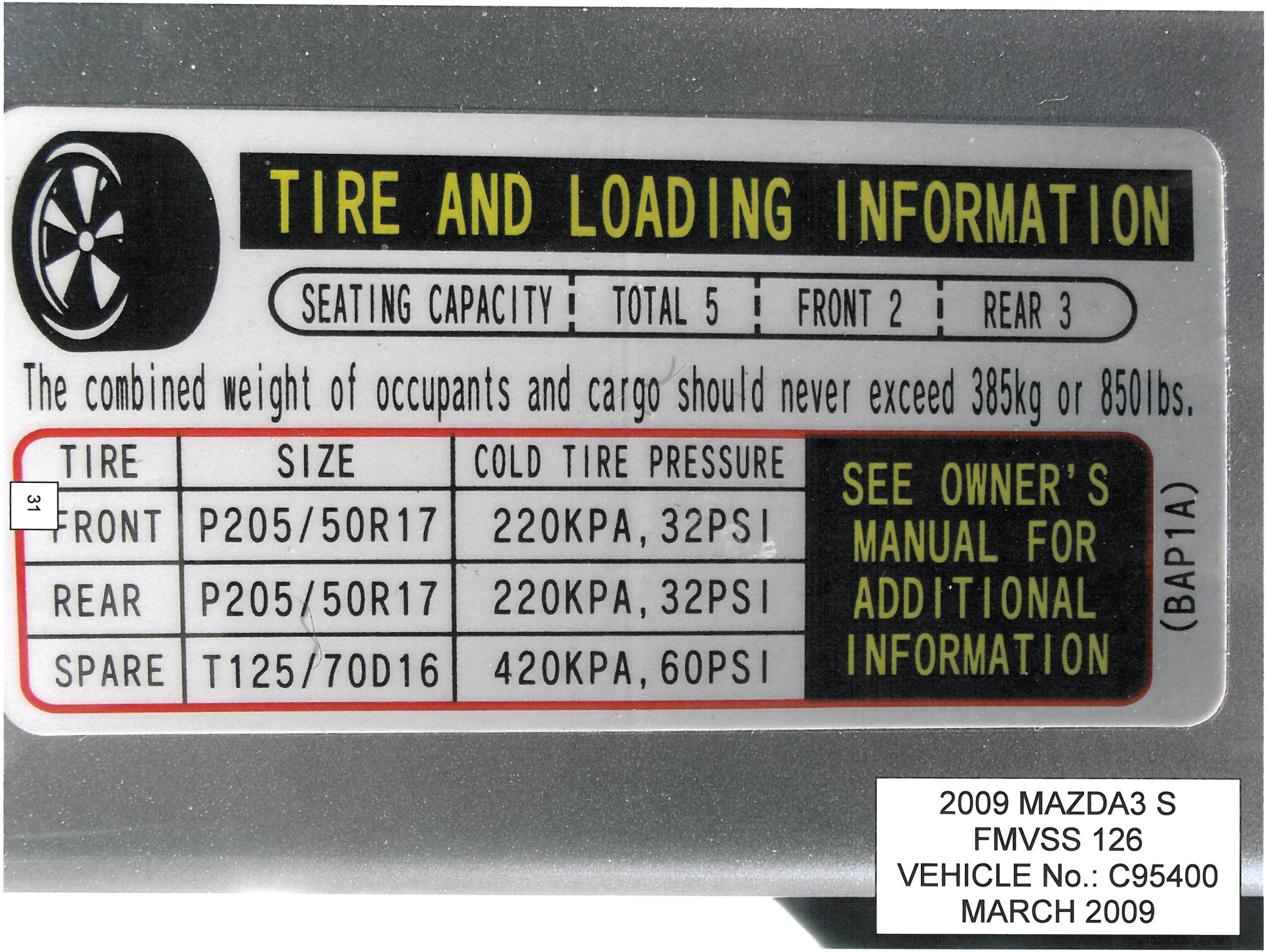
2009 MAZDA3 S
FMVSS 126
VEHICLE No.: C95400
MARCH 2009

5.3 VEHICLE CERTIFICATION LABEL



5.4 TIRE AND LOADING INFORMATION LABEL

EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models

CITY MPG

22

Expected range for most drivers **18** to **26** MPG

Estimated Annual Fuel Cost

$2,565

based on 15,000 miles at $4.10 per gallon

HIGHWAY MPG

28

Expected range for most drivers **23** to **33** MPG

Combined Fuel Economy

This Vehicle

24

11 — 42

COMPACT

Your actual mileage will vary depending on how you drive and maintain your vehicle.

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 0%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 95%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: HIROSHIMA, JAPAN
COUNTRY OF ORIGIN:
ENGINE: JAPAN
TRANSMISSION: JAPAN

GOVERNMENT SAFETY RATINGS

Frontal Crash	Driver	★★★★
	Passenger	★★★★

Star ratings based on the risk of injury in a frontal impact.
Frontal rating should ONLY be compared to other vehicles of similar size and weight.

Side Crash	Front seat	**Not Rated**
	Rear seat	**Not Rated**

Star ratings based on the risk of injury in a side impact.

Rollover ★★★★

Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

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2009 mazda 3

zoom-zoom

Model: **2009 MAZDA3 S 4-DOOR TOURING**
Exterior Color: **SUNLIGHT SILVER METALLIC**
Interior Color: **BLACK**

LP

JM1BK323691232072

SOLD TO: 61558
BASS MAZDA
4900 DETROIT ROAD
SHEFFIELD VILLAGE, OH 44035

SHIP TO: 61558
BASS MAZDA
4900 DETROIT ROAD
SHEFFIELD VILLAGE, OH 4403

M3S---STR-A----BAP6NAG-TA-----TA-----2008102(

This label is affixed pursuant to the Federal Automobile Disclosure Act. Gasoline, License and Title fees, State and Local taxes, and Dealer installed options are not included.

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES
- 2.3L DOHC 16-VALVE I4 ENG. W/VVT
- 5-SPEED SPORT AUTOMATIC TRANSMISSION
- FRONT WHEEL DRIVE
- INDEPENDENT FRONT/REAR SUSPENSION
- FRONT & REAR STABILIZER BARS
- VARIABLE-ASSIST POWER STEERING
- 4-WHEEL DISC BRAKES
- ANTI-LOCK BRAKE SYSTEM (ABS) W/EBD & BRAKE ASSIST
- DYNAMIC STABILITY CONTROL (DSC)
- TRACTION CONTROL SYSTEM (TCS)

EXTERIOR FEATURES
- 17-INCH ALLOY WHEELS
- P205/50 R17 ALL-SEASON TIRES
- HALOGEN HEADLIGHTS & FOG LIGHTS
- VARIABLE INTERMITTENT FRONT WIPERS
- SIDE TURN-SIGNAL REPEATER LIGHTS
- REAR WINDOW DEFOGGER
- BODY COLOR DUAL POWER MIRRORS
- SPORT-TYPE FRONT & REAR BUMPERS
- SIDE SILL EXTENSIONS

INTERIOR FEATURES
- CLOTH SEATS & CARPET FLOOR MATS
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- AM/FM/CD W/MP3 6-SPEAKER AUDIO
- STEERING WHEEL AUDIO CONTROLS
- SIRIUS SATELLITE RADIO COMPATIBLE
- AUXILIARY AUDIO INPUT JACK
- TILT & TELESCOPIC STEERING COLUMN
- CRUISE CONTROL
- POWER WINDOWS & DOOR LOCKS
- DUAL ILLUM VISOR VANITY MIRRORS
- AIR CONDITIONING W/ POLLEN FILTER
- CENTER ARMREST W/ DUAL STORAGE
- DUAL FRONT CUP HOLDERS & DOOR POCKETS W/ BOTTLE HOLDERS
- ADJUSTABLE DRIVER'S SEAT HEIGHT & LUMBAR SUPPORT
- REAR CENTER ARMREST /2 CUPHOLDERS
- LEATHER-WRAPPED STEERING WHEEL
- ELECTROLUMINESCENT GAUGES

SAFETY AND SECURITY FEATURES
- 36-MONTH/36,000 MILE "BUMPER-TO-BUMPER WARRANTY"
- 60 MONTH / 60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- ADVANCED DUAL FRONT AIR BAGS(SRS)
- TIRE PRESSURE MONITORING SYSTEM
- ANTI-WHIPLASH FRONT SEAT DESIGN
- LATCH CHILD SAFETY SEAT ANCHORS
- "TRIPLE-H" BODY CONSTRUCTION
- ANTI-THEFT ENGINE IMMOBILIZER
- REMOTE KEYLESS ILLUMINATED ENTRY
- SIDE-IMPACT AIR BAGS & CURTAINS

MSRP*	**$19,775**
Total Vehicle and Options	$19,775
Delivery, Processing and Handling Fee	$670
Total MSRP*	**$20,445**

All children instinctively know it.

A few adults still remember it. One unique car company refuses to outgrow it.

In grown-up language, it means the exhilaration and liberation that come from experiencing sheer motion.

But as usual, children put it much better.

And simply call it Zoom-Zoom.

We practice it every day. It's why we build the kind of cars we do.

Mazda. Always the soul of a sports car.®

MazdaUSA.com

* MSRP (Manufacturer's Suggested Retail Price)

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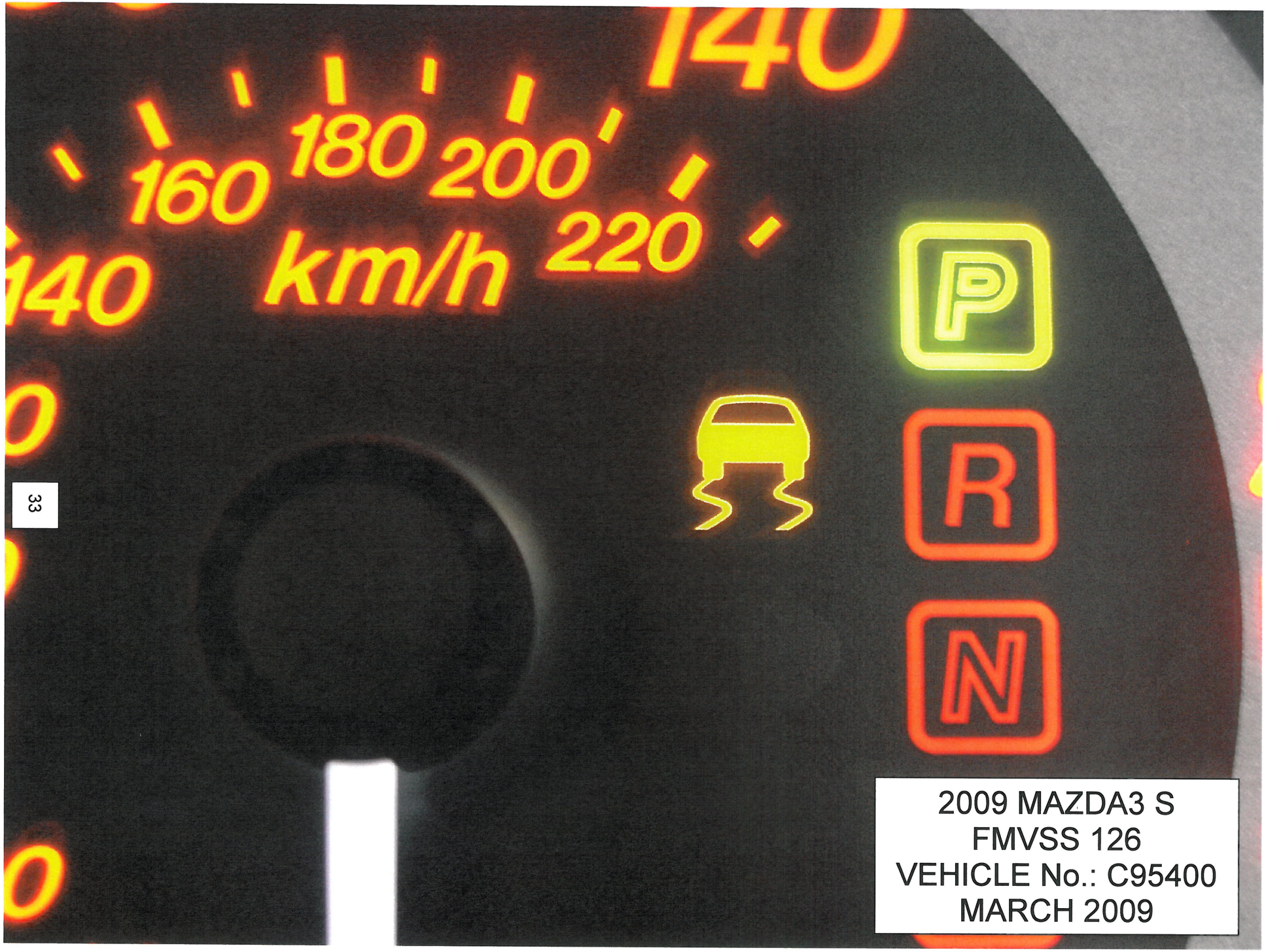
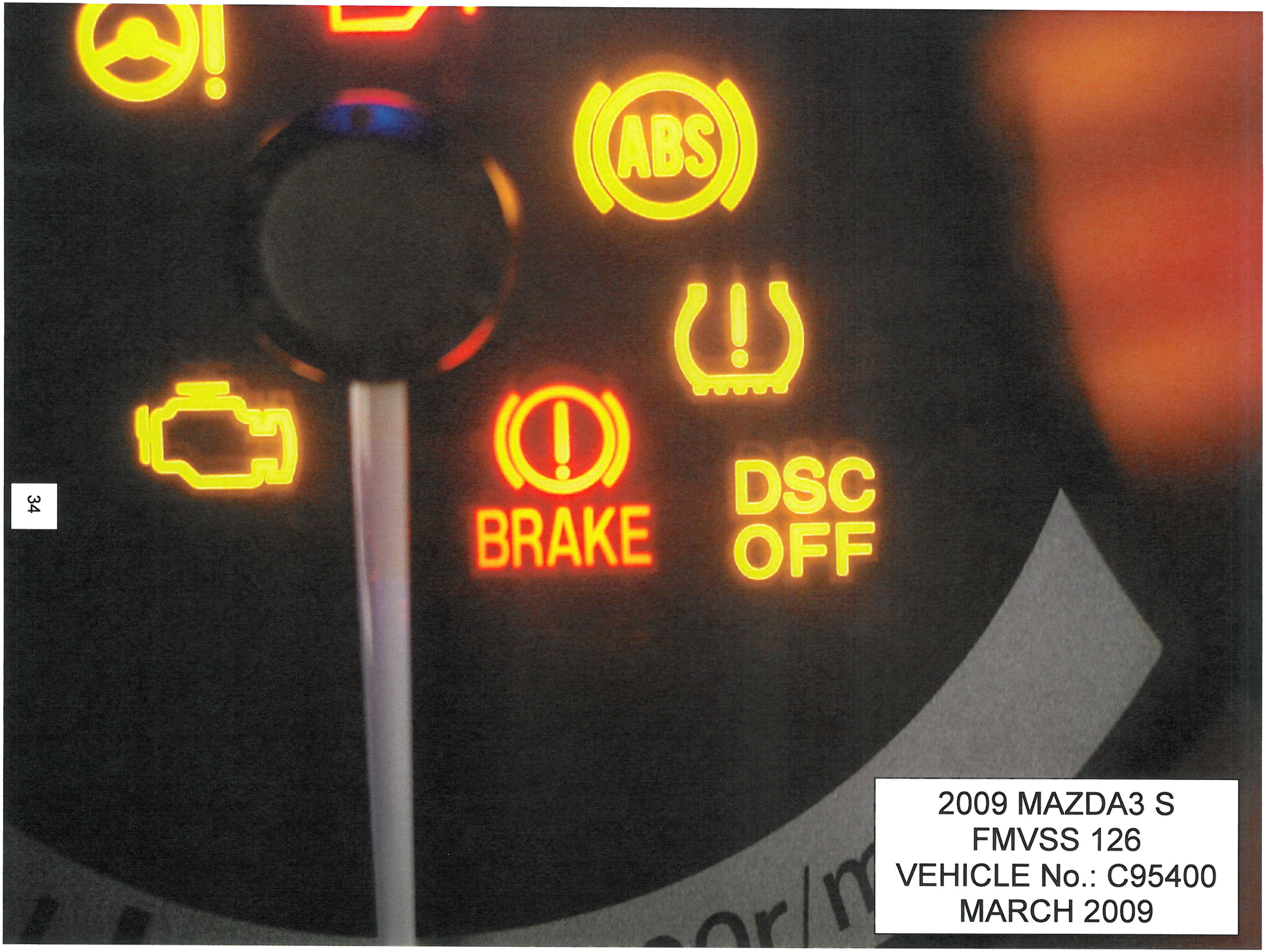
2009 MAZDA3 S
FMVSS 126
VEHICLE No.: C95400
MARCH 2009

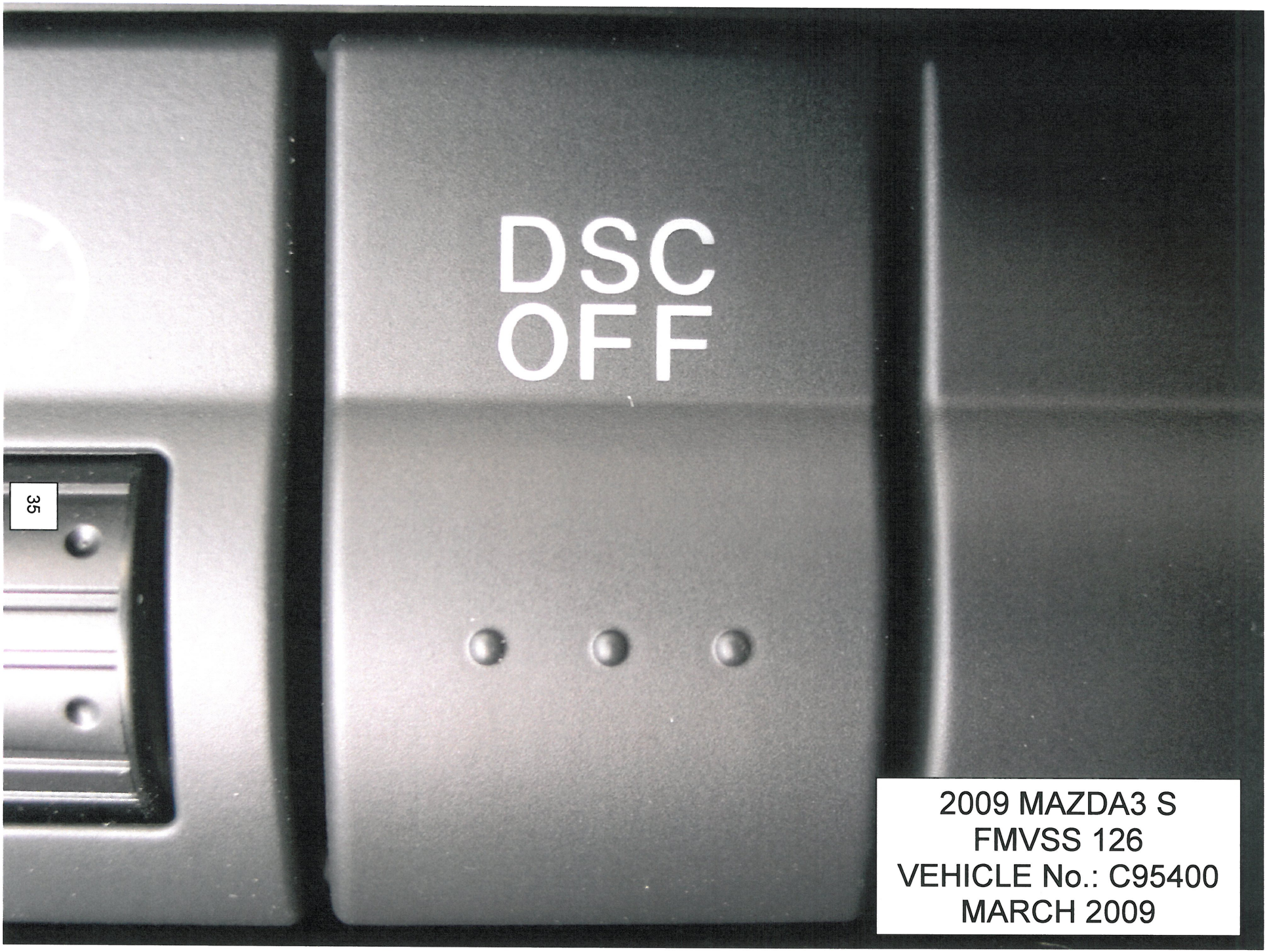
5.5 WINDOW STICKER - MONRONEY LABEL



5.6 ESC MALFUNCTION AND ESC OFF TELLTALE



5.7 SECONDARY ESC OFF TELLTALE

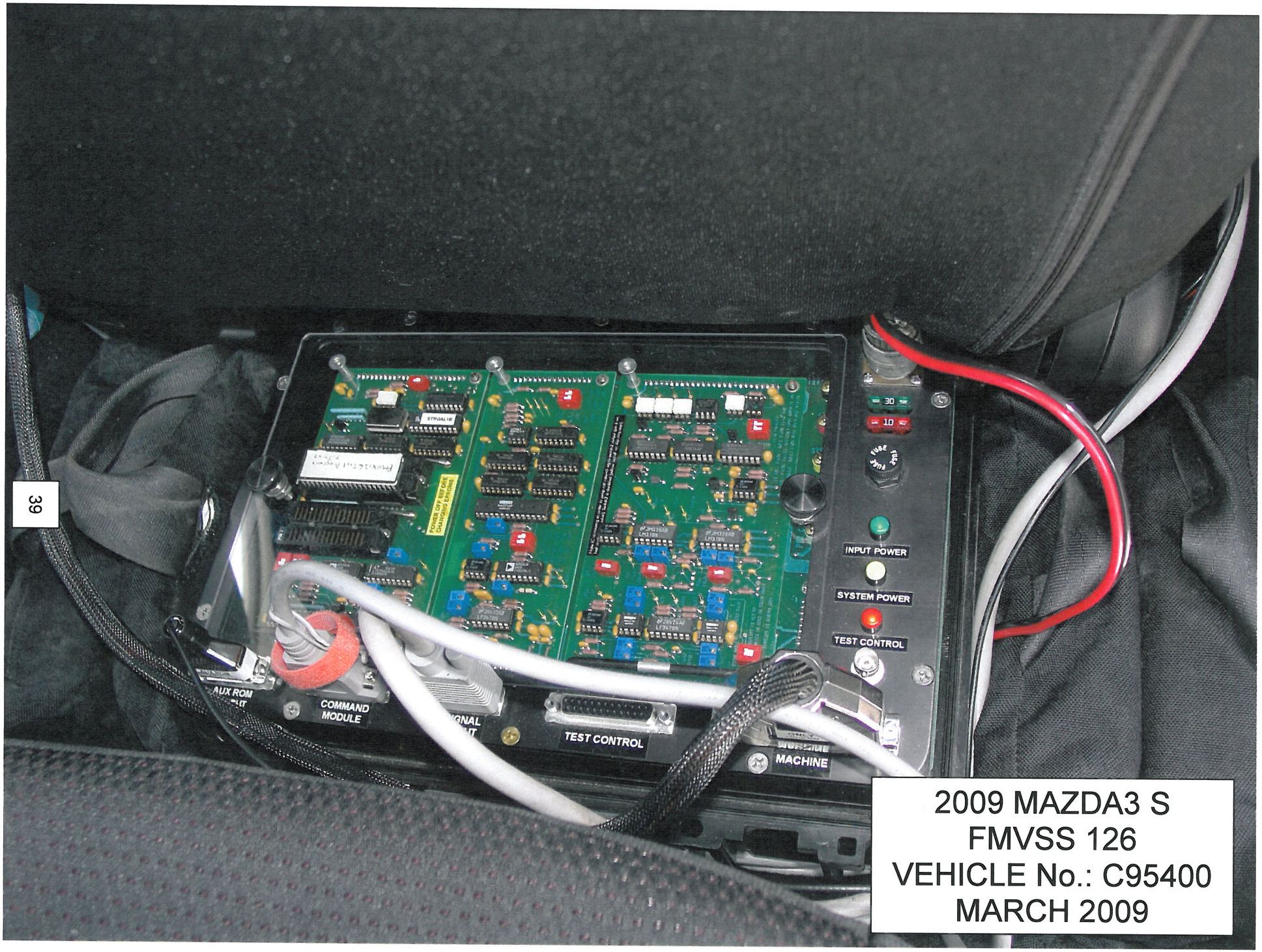


5.8 ESC OFF CONTROL

5.9 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED

5.10 ¾ REAR VIEW - TEST VEHICLE INSTRUMENTED

5.11 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM



2009 MAZDA3 S
FMVSS 126
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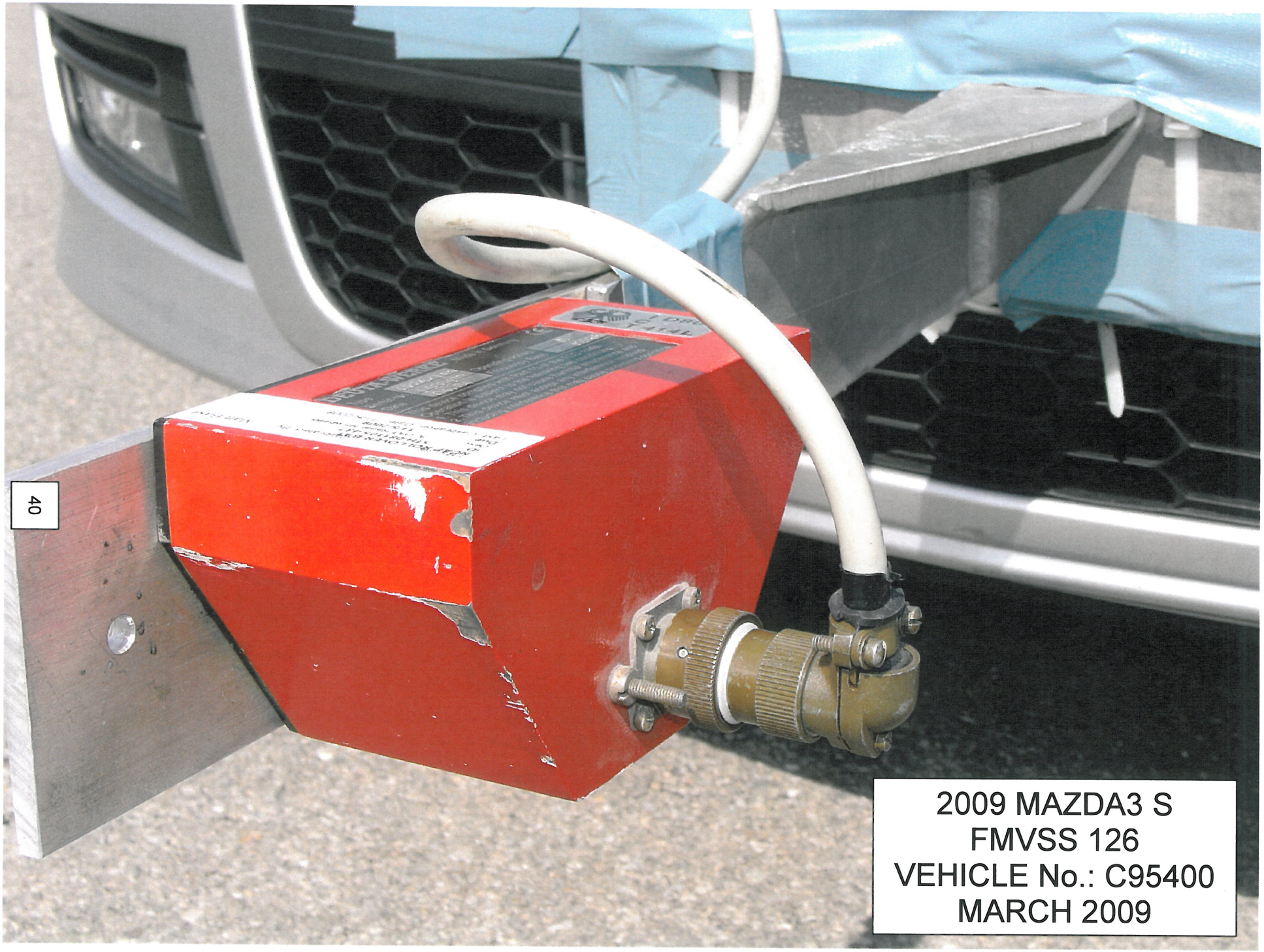
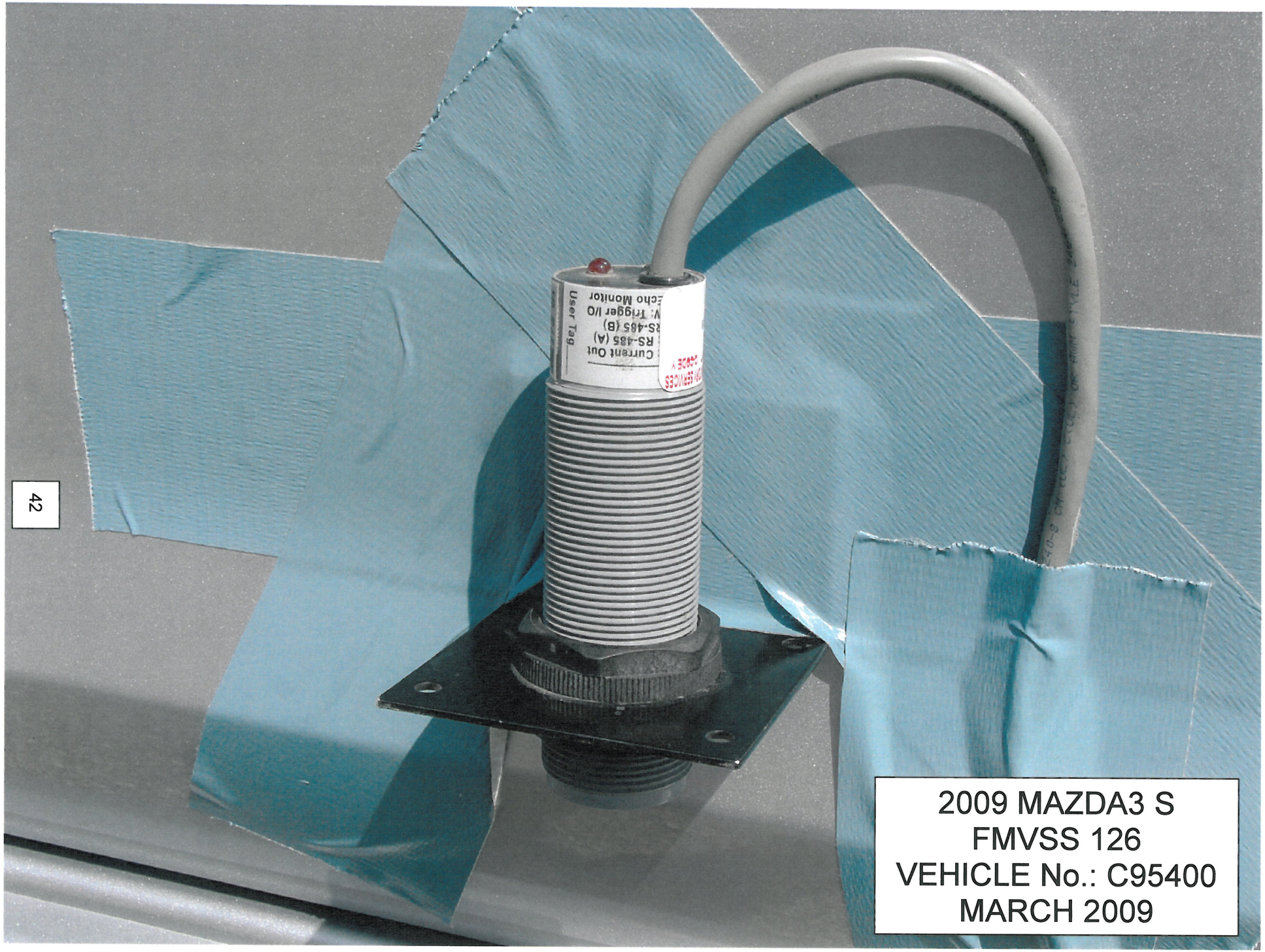
5.12 STEERING CONTROLLER BATTERY BOX



5.13 VEHICLE SPEED SENSOR

5.14 BODY ROLL SENSOR (DRIVER SIDE)



5.15 BODY ROLL SENSOR (PASSENGER SIDE)

6.0 DATA PLOTS

6.0 DATA PLOTS

Figure 1. Steering Angle and Yaw Rate Time History, Counter-Clockwise Initial Steer Tests

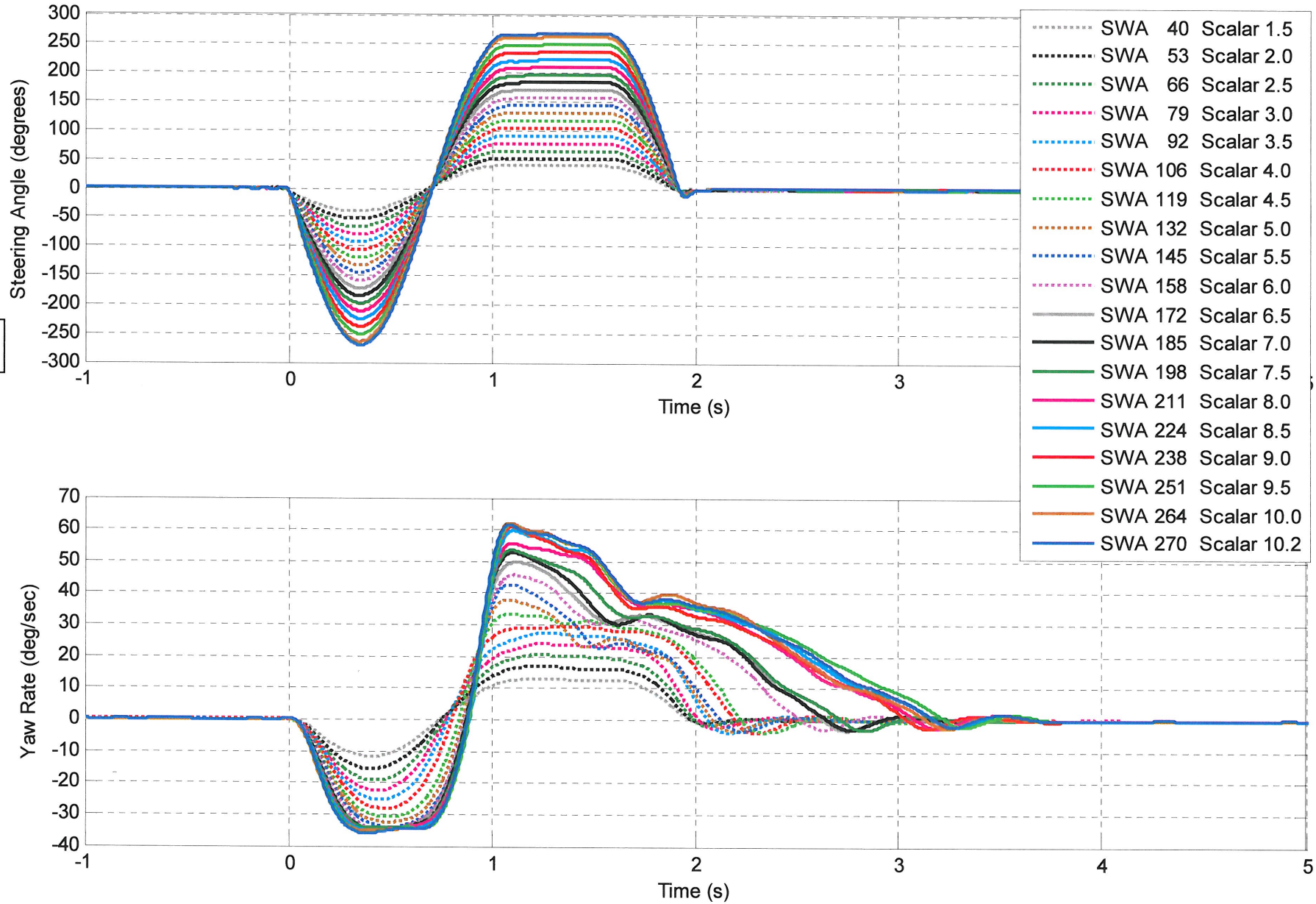


Figure 2. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Counter-Clockwise Initial Steer Tests

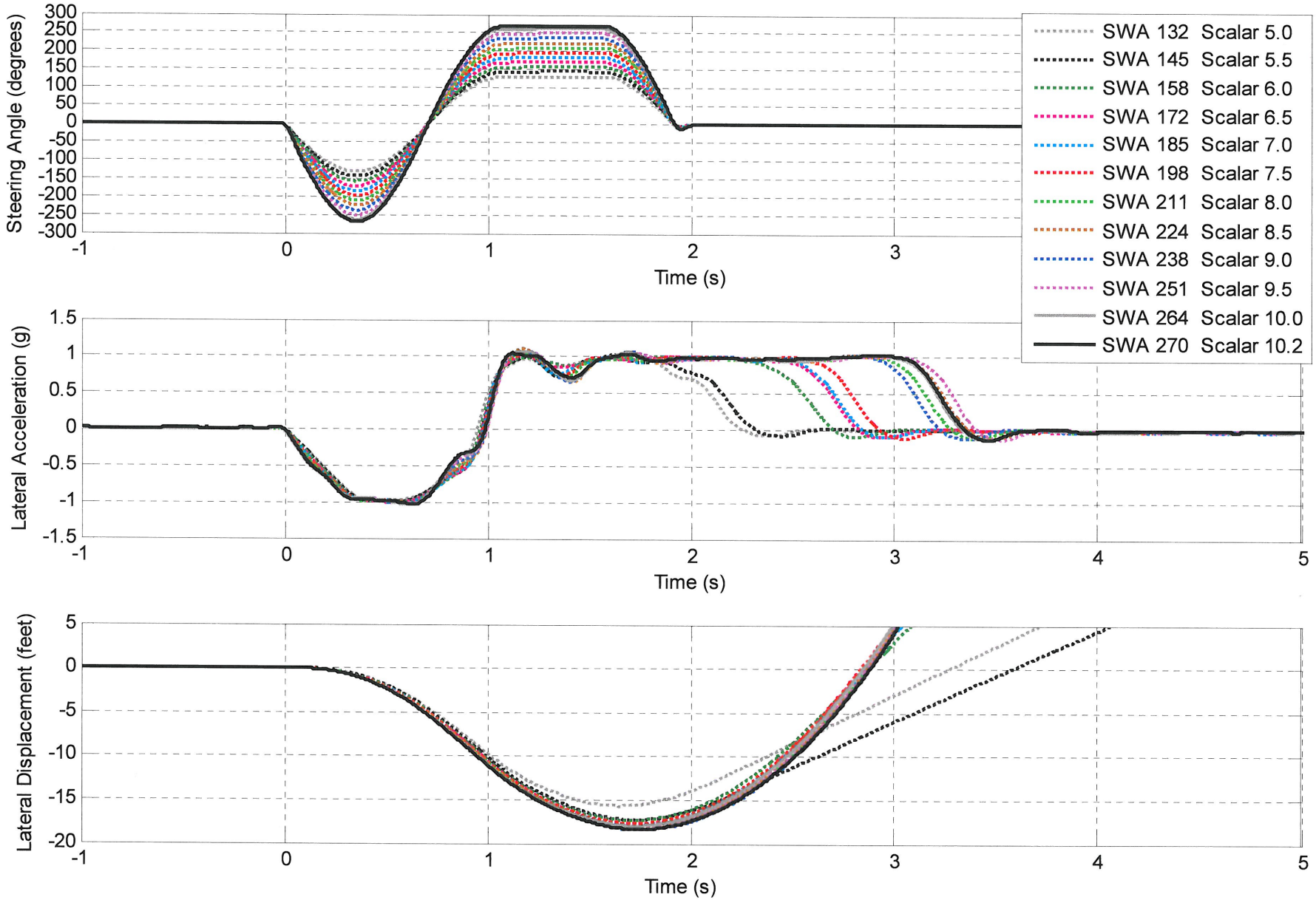


Figure 3. Steering Angle and Yaw Rate Time History, Clockwise Initial Steer Tests

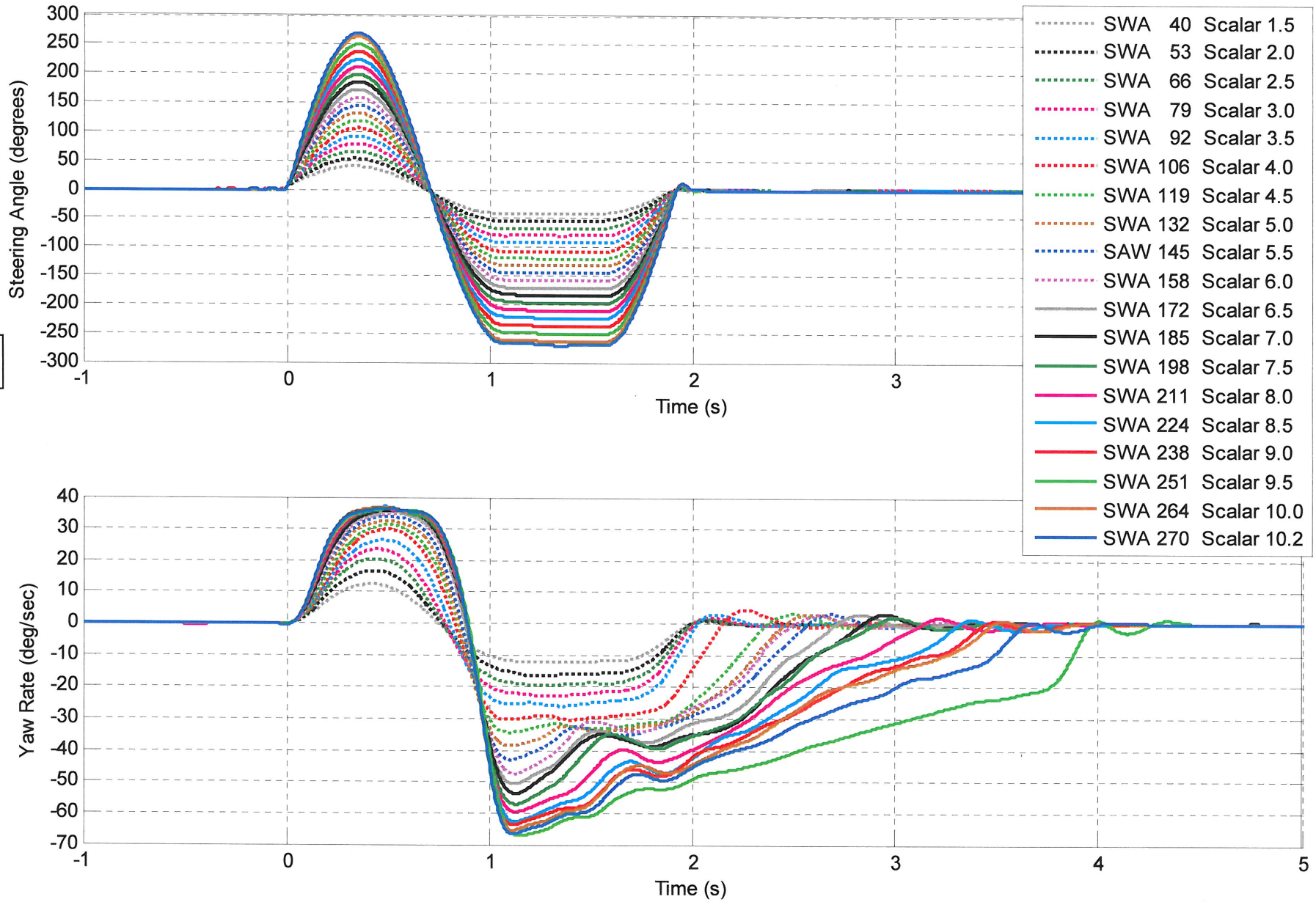
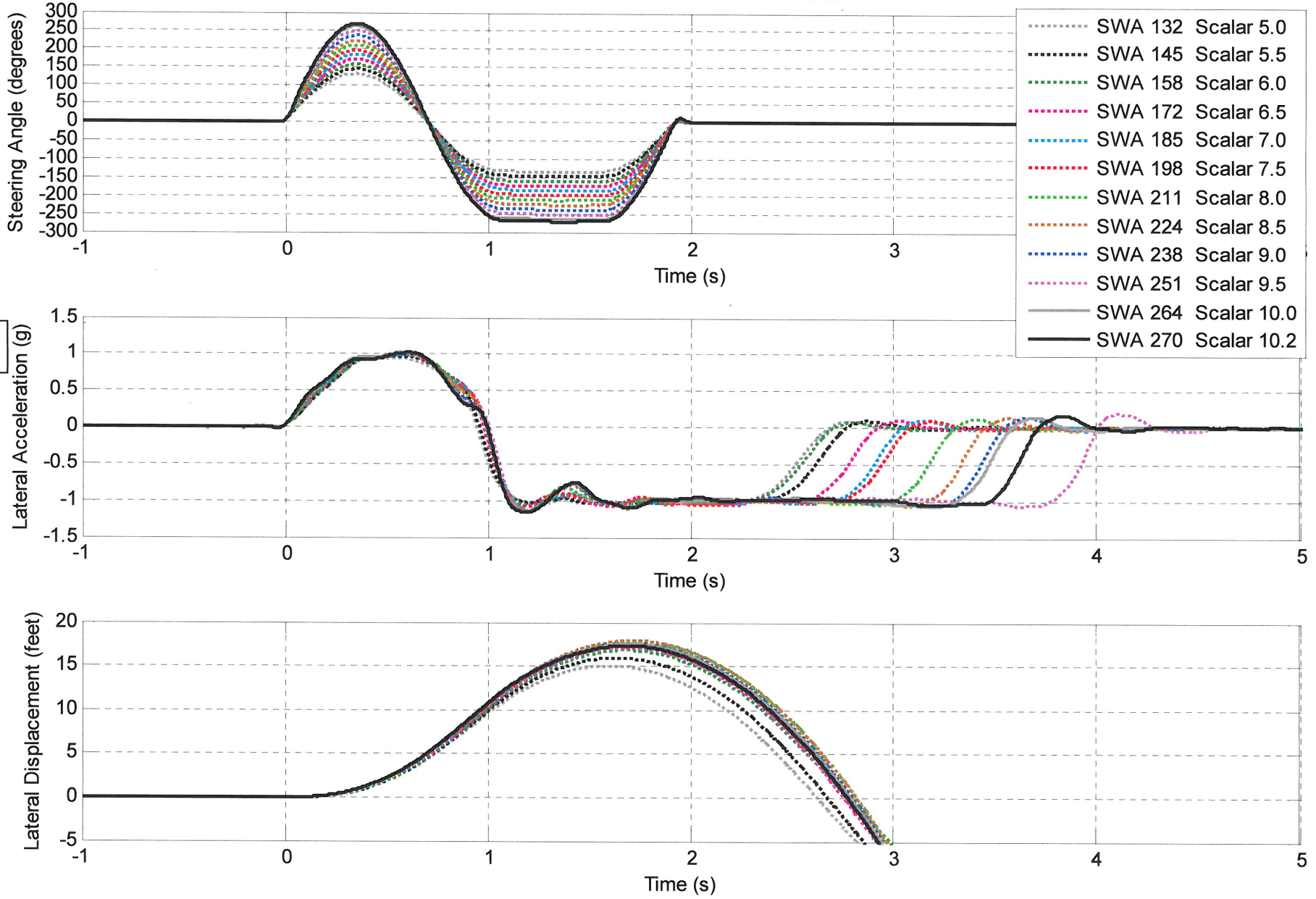


Figure 4. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Clockwise Initial Steer Tests

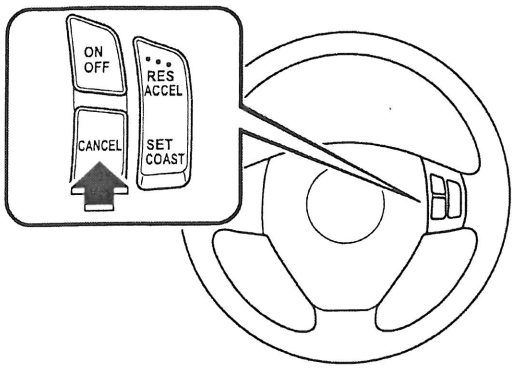


7.0 OTHER DOCUMENTATION

7.1 OWNER'S MANUAL PAGES
7.2 VEHICLE ARRIVAL CONDITION REPORT
7.3 VEHICLE COMPLETION CONDITION REPORT
7.4 SINE WITH DWELL TEST RESULTS
7.5 SLOWLY INCREASING STEER TEST RESULTS
7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

7.1 OWNER'S MANUAL PAGES

- Press the CANCEL switch.



The system turns off when the ignition is off.

NOTE

Cruise control will cancel at about 15 km/h (9 mph) below the preset speed (such as may happen when climbing a long, steep grade) or below 25 km/h (16 mph).

Traction Control System (TCS)*

The Traction Control System (TCS) enhances traction and safety by controlling engine torque and braking*. When the TCS detects driving wheel slippage, it lowers engine torque and operates the brakes* to prevent loss of traction.

This means that on a slick surface, the engine adjusts automatically to provide optimum power to the drive wheels without causing them to spin and lose traction.

* DSC-equipped vehicles only

⚠ WARNING

Do not rely on the traction control system as a substitute for safe driving:

The traction control system (TCS) cannot compensate for unsafe and reckless driving, excessive speed, tailgating (following another vehicle too closely), and hydroplaning (reduced tire friction and road contact because of water on the road surface). You can still have an accident.

Use snow tires or tire chains and drive at reduced speeds when roads are covered with ice and/or snow:

Driving without proper traction devices on snow and/or ice-covered roads is dangerous. The traction control system (TCS) alone cannot provide adequate traction and you could still have an accident.

NOTE
To turn off the TCS, press the DSC OFF switch (page 5-25).

▼TCS/DSC Indicator Light

This indicator light stays on for a few seconds when the ignition switch is turned to the ON position. If the TCS or DSC is operating, the indicator light flashes.

If the light stays on, the TCS or DSC may have a malfunction and they may not operate correctly. Take your vehicle to an Authorized Mazda Dealer.

NOTE
- *In addition to the indicator light flashing, a slight lugging sound will come from the engine. This indicates that the TCS is operating properly.*
- *On slippery surfaces, such as fresh snow, it will be impossible to achieve high rpm when the TCS is on.*

Dynamic Stability Control (DSC)*

The Dynamic Stability Control (DSC) automatically controls braking and engine torque in conjunction with systems such as ABS and TCS to help control side slip when driving on slippery surfaces, or during sudden or evasive maneuvering, enhancing vehicle safety.

Refer to ABS (page 5-7) and TCS (page 5-23).

DSC operation is possible at speeds greater than20 km/h (12 mph).

⚠ WARNING

Do not rely on the dynamic stability control as a substitute for safe driving:
The dynamic stability control (DSC) cannot compensate for unsafe and reckless driving, excessive speed, tailgating (following another vehicle too closely), and hydroplaning (reduced tire friction and road contact because of water on the road surface). You can still have an accident.

 *Some models.

⚠ CAUTION

- *The DSC may not operate correctly unless the following are observed:*
  - *Use tires of the correct size specified for your Mazda on all four wheels.*
  - *Use tires of the same manufacturer, brand and tread pattern on all four wheels.*
  - *Do not mix worn tires.*
- *The DSC may not operate correctly when tire chains are used or a temporary spare tire is installed because the tire diameter changes.*

NOTE

After turning the ignition switch to the ON position, a clicking sound may be heard behind the dashboard. This sound is the result of the DSC system self-check operation and does not indicate an abnormality.

▼TCS/DSC Indicator Light

This indicator light stays on for a few seconds when the ignition switch is turned to the ON position. If the TCS or DSC is operating, the indicator light flashes.

If the light stays on, the TCS or DSC may have a malfunction and they may not operate correctly. Take your vehicle to an Authorized Mazda Dealer.

▼DSC OFF Indicator Light

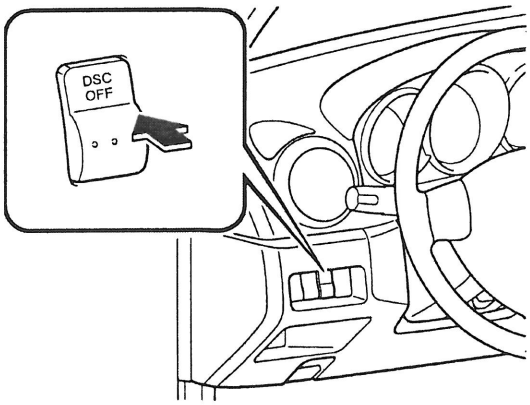
DSC OFF

This indicator light stays on for a few seconds when the ignition switch is turned to the ON position.
It also illuminates when the DSC OFF switch is pressed and TCS/DSC is switched off (page 5-25).

If the light stays on when the TCS/DSC is not switched off, take your vehicle to an Authorized Mazda Dealer. The dynamic stability control may have a malfunction.

▼DSC OFF Switch

To turn off the TCS/DSC, press and hold the DSC OFF switch until the DSC OFF indicator light illuminates.



Press the switch again to turn the TCS/DSC back on. The DSC OFF indicator light will go out.

NOTE

- *When DSC is on and you attempt to free the vehicle when it is stuck, or drive it out of freshly fallen snow, the TCS (part of the DSC system) will activate. Depressing the accelerator will not increase engine power and freeing the vehicle may be difficult. When this happens, turn off the TCS/DSC.*
- *If the TCS/DSC is off when the engine is turned off, it automatically activates when the ignition switch is turned on.*
- *Leaving the TCS/DSC on will provide the best stability.*

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO. DTNH22-08-P-0097 DATE: 2/13/09

FROM: Ricart Automotive, Groveport, Ohio

TO: TRC

PURPOSE: (X) Initial Receipt ( ) Received via Transfer ( ) Present vehicle condition

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2009 / Mazda3 / Passenger Car

MANUFACTURE DATE: 09/08 NHTSA NO.: C95400

BODY COLOR: silver VIN: JM1BK323691232072

ODOMETER READING: 158 miles GVWR: 1,792 KG

PURCHASE PRICE: $ 20,445 DEALER'S NAME: Ricart Automotive

X ALL OPTIONS LISTED ON "WINDOW STICKER" ARE PRESENT ON THE TEST VEHICLE

X TIRES AND WHEEL RIMS ARE NEW AND THE SAME AS LISTED

X THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

X THE VEHICLE HAS BEEN PROPERLY PREPARED AND IS IN RUNNING CONDITION

X THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS

X PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

X PLACE VEHICLE IN STORAGE AREA

X INSPECT THE VEHICLE'S INTERIOR AND EXTERIOR, INCLUDING ALL WINDOWS, SEATS, DOORS, ETC., TO CONFIRM THAT EACH SYSTEM IS COMPLETE AND FUNCTIONAL PER THE MANUFACTURER'S SPECIFICATIONS. ANY DAMAGE, MISADJUSTMENT, OR OTHER UNUSUAL CONDITION THAT COULD INFLUENCE THE TEST PROGRAM OR TEST RESULTS SHALL BE RECORDED. REPORT ANY ABNORMAL CONDITION TO THE NHTSA COTR BEFORE BEGINNING ANY TEST

RECORDED BY: Alan Ida DATE: 3-17-09

APPROVED BY: Jeff Sankey DATE: 4-30-09

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO. DTNH22-08-P-0097 DATE: 4/29/09

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2009 / Mazda3 / Passenger Car

MANUFACTURE DATE: 09/08 NHTSA NO.: C95400

BODY COLOR: silver VIN: JM1BK323691232072

ODOMETER READING: 246 miles GVWR: 1,792 KG

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: 126

X THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

X THE VEHICLE HAS BEEN PROPERLY MAINTAINED AND IS IN RUNNING CONDITION

X THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS

X PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

REMARKS:

Equipment that is no longer on the test vehicle as noted on Vehicle Arrival Condition Report:
None.

Explanation for equipment removal:
N/A

Test Vehicle Condition:
Like new.

RECORDED BY: Alan Ida DATE: 4-29-09
APPROVED BY: Jeff Sankey DATE: 4-30-09

7.4 SINE WITH DWELL TEST RESULTS

2009 Mazda3

NHTSA No.: C95400

Date Created 24-Mar-09

File	SWA @ 5deg Ct	MES	Time@5deg	COS	Time@COS	MOS	Time@MOS	YRR1(%)	YR1 (deg/sec)	YRR1 Ct	YRR175(%)
35	617	50.26204413	3.079472525	998	4.981990884	754	3.760806205	0.112572493	0.014391858	1198	-0.869304915
36	616	50.18535763	3.072719022	998	4.981105294	754	3.760776125	-0.208194684	-0.035076016	1198	-0.354015343
37	615	50.39347011	3.068001321	997	4.979775063	754	3.760044427	0.251779855	0.052473542	1197	-0.287284165
38	615	50.16901399	3.067845415	998	4.982519356	754	3.762924265	-0.039928572	-0.009572079	1198	0.145841972
39	614	50.38668336	3.063179826	997	4.979596148	754	3.760707836	-0.214833336	-0.059522092	1197	0.127597438
40	613	50.4569457	3.059420336	997	4.977629037	753	3.758793104	-1.404221497	-0.403428254	1197	-0.422936225
41	613	50.35309276	3.058616919	997	4.977738471	753	3.759264218	-0.406620095	-0.136466205	1197	-0.061734031
42	613	50.37230077	3.058575778	997	4.978442947	754	3.760202908	-0.071183448	-0.026967539	1197	0.262205577
43	613	50.33254255	3.059322533	997	4.979654846	754	3.761719023	-0.660008197	-0.281494221	1197	-0.161830649
44	613	50.29978699	3.057830262	997	4.978422866	754	3.760723701	2.51015618	1.145833603	1197	-0.056347198
45	613	50.29294593	3.055509484	997	4.976136971	753	3.758473259	0.396913344	0.197410538	1197	-0.240887821
46	613	50.24197326	3.056466527	997	4.977156268	753	3.759658514	0.009597766	0.005054314	1197	0.012402066
47	613	50.32513518	3.057273693	997	4.977795241	754	3.760829905	-3.315645867	-1.775726079	1197	0.190714587
48	613	50.59676222	3.058530577	997	4.978770398	754	3.761772592	11.55374929	6.456932124	1197	-0.021383209
49	613	50.32455361	3.059061598	997	4.9794207	754	3.762272302	14.08718454	8.426013686	1197	0.790843155
50	613	50.49798866	3.056052002	997	4.975525398	753	3.75903806	10.32624002	6.308602993	1197	-0.226046062
51	613	50.45949496	3.058463186	997	4.977819291	754	3.761367396	17.6054776	10.88918349	1197	1.500260758
52	613	50.40363587	3.055060174	996	4.973902899	753	3.757630888	12.55354123	7.801160296	1196	0.497509698
53	613	50.26614377	3.058844811	997	4.977612439	754	3.761431787	14.55542693	8.930000329	1197	0.330486108
54	617	50.29068038	3.079928747	998	4.984341976	754	3.760847523	-0.755000893	0.09215123	1198	-1.183318711
55	616	50.47709679	3.074856172	998	4.984514437	754	3.762093501	0.032627527	-0.005399715	1198	-0.869592886
56	615	50.2004694	3.066368136	997	4.979567356	753	3.757773995	-0.762990175	0.147971031	1197	-0.925263418
57	615	50.36491727	3.06589061	998	4.981324796	754	3.760377195	-0.434456868	0.099444505	1198	-1.036063585
58	614	50.26431185	3.063844805	998	4.981383615	754	3.760995532	-0.564071877	0.142758955	1198	-0.654046458
59	614	50.23532226	3.062923809	998	4.981499186	754	3.762064205	-1.02377141	0.309881382	1198	-0.25112162
60	613	50.22334809	3.057667887	997	4.97744788	753	3.758028628	0.787468325	-0.268665421	1197	-0.40317642
61	614	50.39575074	3.060158851	998	4.980334099	754	3.761497195	1.886388196	-0.724958868	1198	-0.342430028
62	613	50.42302194	3.058009422	997	4.978516305	754	3.760126355	1.842526354	-0.790799239	1197	-0.128778909
63	613	50.30119544	3.058317877	997	4.978759302	754	3.760951034	1.71391626	-0.811412825	1197	-0.332253065
64	613	50.28593254	3.057353656	997	4.977965521	754	3.760119903	-3.3431915	1.685249368	1197	-0.419961532
65	613	50.20827959	3.059228459	997	4.979580804	754	3.762091358	-5.088654261	2.732934031	1197	-0.543459094
66	613	50.3252535	3.056242956	997	4.976798693	753	3.759339757	-0.846616204	0.481860205	1197	-0.353788208
67	613	50.35581019	3.057654755	997	4.978033739	754	3.760744191	12.8465255	-7.618887545	1197	-0.48965385
68	613	50.45825698	3.055458744	997	4.97551645	753	3.758183453	19.44687051	-12.16470665	1197	1.888483192
69	613	50.42996943	3.057094397	997	4.977283547	753	3.759894449	22.60716542	-14.3355183	1197	2.864205666
70	613	50.4149992	3.058590584	997	4.978348691	754	3.76119115	**48.63073475**	-32.62007342	1197	**32.15576385**
71	613	50.21600729	3.056726279	997	4.975580185	753	3.759145873	25.58853983	-16.72400873	1197	2.313215217
72	613	50.32186224	3.05897696	997	4.978000446	754	3.761381191	33.87063325	-22.47518969	1197	-0.920192164

7.4 SINE WITH DWELL TEST RESULTS

2009 Mazda3

NHTSA No.: C95400

Date Created 24-Mar-09

File	YR175 (deg/sec)	YRR175 Ct	2nd Yaw Peak(deg/sec)	2nd Yaw Peak Ct	Lat Disp (ft)	Lat. Acc. 1.07s (g)	1st SWA Peak(deg)	1st SWA Peak Ct	2nd SWA Mean(deg)
35	-0.1111365	1348	12.78452456	873	-4.084263429	0.444065763	39.86931682	682	39.92711476
36	-0.059643444	1348	16.84770015	863	-5.372944512	0.57059843	52.98786804	682	52.92175626
37	-0.05987301	1347	20.84104082	861	-6.602450001	0.666915458	65.86739329	682	65.89954315
38	0.034962706	1348	23.97300664	864	-7.644387233	0.73950099	78.79351115	683	78.86039695
39	0.035352365	1347	27.70617125	868	-8.520236067	0.803663575	91.62161424	682	91.76920046
40	-0.121508197	1347	28.72967368	841	-9.558330468	0.822776978	105.8407614	682	106.0236957
41	-0.020718624	1347	33.56110692	831	-10.32206362	0.826649388	118.7449532	682	118.9568057
42	0.099335439	1347	37.88456366	829	-10.93085742	0.810620927	131.7012115	682	131.8981477
43	-0.06902095	1347	42.65010993	830	-11.47006996	0.802712892	144.5818124	683	144.9675316
44	-0.025721313	1347	45.64790079	835	-11.69614317	0.819172651	157.5849218	683	157.725555
45	-0.119809009	1347	49.7364327	836	-11.84281767	0.823904528	171.4869275	682	171.6941079
46	0.006531097	1347	52.66136385	833	-11.87697252	0.84503553	184.5599324	682	184.6790591
47	0.102139034	1347	53.55596316	832	-11.87171645	0.832546303	197.4930944	683	197.6307325
48	-0.011950227	1347	55.88603286	832	-12.13805772	0.821909087	210.7682653	683	210.8226752
49	0.473029599	1347	59.81332651	833	-12.11589398	0.835131551	223.6540223	683	223.8720857
50	-0.138098171	1347	61.09293392	832	-12.23947776	0.822303947	237.621105	683	237.5859132
51	0.927927946	1347	61.85111097	832	-12.2187575	0.807738217	250.2323165	683	250.5004466
52	0.309167974	1346	62.14310492	830	-12.20506955	0.836105746	263.229476	682	263.5517314
53	0.202758811	1347	61.35168945	829	-12.41322603	0.843180138	269.1216106	683	269.5345062
54	0.144429332	1348	-12.20544651	860	4.387810999	-0.421948999	40.49915596	682	40.49262586
55	0.143913867	1348	-16.54956807	864	5.672570055	-0.550755832	53.50378349	683	53.5391236
56	0.179441605	1347	-19.39356966	869	6.862171132	-0.651605906	66.44337594	682	66.55052144
57	0.237148582	1348	-22.88938493	874	7.879364677	-0.728545657	79.32650276	682	79.54022802
58	0.165530303	1348	-25.30864603	832	8.681344373	-0.773216497	92.24437449	683	92.36693281
59	0.076011025	1348	-30.26861066	832	9.598346664	-0.79844025	106.4950081	683	106.7117846
60	0.137554184	1347	-34.11761623	833	10.23973967	-0.794007468	119.4010541	682	119.5782831
61	0.131599469	1348	-38.43105407	833	10.78541226	-0.818418777	132.3479229	683	132.4814017
62	0.055270994	1347	-42.91929053	834	11.15198723	-0.814228755	145.3311822	682	145.3937073
63	0.157297299	1347	-47.34261782	837	11.42329706	-0.772811143	158.3313019	683	158.3852492
64	0.211695892	1347	-50.40840071	837	11.65532199	-0.797411014	172.280934	682	172.2709012
65	0.291872424	1347	-53.70642002	838	11.80169982	-0.77185945	185.1846432	683	185.2707227
66	0.201362149	1347	-56.91601493	838	11.88118605	-0.791887227	198.170012	682	198.2870222
67	0.290398958	1347	-59.3069896	838	12.07008074	-0.804117059	211.3395562	683	211.5135306
68	-1.181313159	1347	-62.55354371	837	12.11786388	-0.784603984	224.2113721	682	224.310778
69	-1.816232685	1347	-63.41139209	836	12.10878213	-0.81452838	237.9039833	683	238.2222304
70	-21.56914517	1347	-67.07707294	841	11.9082791	-0.760652268	250.7515283	683	251.163168
71	-1.511857719	1347	-65.35741717	835	12.18422987	-0.823625046	263.7092982	682	264.2388285
72	0.610602503	1347	-66.35597725	836	12.06036116	-0.832410948	269.8739711	683	270.0226314

7.5 SLOWLY INCREASING STEER TEST RESULTS

2009 Mazda3

NHTSA No.: C95400

Date Created 24-Mar-09

File	Vehicle	EventPt	DOS	MES [mph]	Mean SPD [mph]	AYcount_3	THETAENCF_3 [degree]	AYCG_CD2_3 [g]	r_squared	ZeroBegin	ZeroEnd
27	2009 Mazda3	695	1	49.99081383	50.13973853	1100	-26.9729735	-0.300032726	0.997399945	495	695
28	2009 Mazda3	566	1	50.29311764	49.90428407	1113	-27.48978704	-0.297841672	0.998889736	366	566
29	2009 Mazda3	694	1	49.89621663	50.11621914	1103	-27.12766801	-0.301316915	0.998081822	494	694
31	2009 Mazda3	699	0	50.43887748	50.19015466	1075	25.68517485	0.296344285	0.99884546	499	699
32	2009 Mazda3	700	0	50.49312191	50.20079931	1070	25.30259849	0.300536397	0.999107469	500	700
33	2009 Mazda3	585	0	50.72618753	50.09136544	1070	25.54046536	0.298450844	0.999453012	385	585
	Averages						26.4	0.29908714			

Scalars	Steering Angles (deg)
1.5	40
2	53
2.5	66
3	79
3.5	92
4	106
4.5	119
5	132
5.5	145
6	158
6.5	172
7	185
7.5	198
8	211
8.5	224
9	238
9.5	251
10	264
10.2	270

7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

2009 Mazda3

NHTSA No.: C95400

Device : U12-05-08-07108
device version : 2.24
device certification date : 09/26/08
today is : 3/24/2009
units : Millimeters

Label	ActualX	ActualY	ActualZ
C_DEVICEPOS001			
M_PLANE001	1877.098	-535.821	-300.1086
M_LINE001	571.893	33.8015	-63.0586
M_FRONT_AXLE_CENTER	0	0	0
C_COORDSYS001	0	0	0
M_TIRE_TREAD_CENTER	277.7258	88.6378	-164.7434
M_INERTIA_PACK	1501.112	860.6568	187.1284
M_ROOF	1756.109	859.92	1150.634
M_GROUND	1671.821	-192.7806	-299.1232
Track Width		1533	
Roof Height (relative to ground)			1449.757
Motion Pak - x-distance (mm)	1501.112		
Motion Pak - y-distance (mm)		5.519	
Motion Pak - z-distance (mm)			441.8016
Motion Pak - x-distance (inches)	59.099		
Motion Pak - y-distance (inches)		0.217	
Motion Pak - z-distance (inches)			17.394